

WESTERN INDUSTRY



Distinctly Western-style industrial architecture and latest lighting techniques make this new plant easy on the eyes inside and outside . . . p. 29

Photos by Don Shopero.

How to diagnose and cure electric motor troubles . . . page 35

Ways to save water (and dollars) at your plant . . . page 50

The Western distributor has to know his business! . . . page 54

MAY 1951

VOLUME XVI • NUMBER 5



CABCO INDUSTRIAL WIREBOUND CONTAINERS

Cabco wirebound crate custom-designed for West Coast water heater company cuts packing time 50%, replaces costly 24-piece nailed crate. Permits packing of 30-gallon heater in 8 minutes, saves up to 13% on shipping weight.

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There's more to a CABCO container than wood, wire and price

Cabco has its own timberstands, its own mills, its own uniform supply of clear, strong Douglas fir. From forest to you, we control every step in the design and manufacture of Cabco wooden shipping containers. That's why they're uniform in strength, uniform in lightness, uniform in durability, dependable in performance. That's why Cabco has been the West's foremost designer and supplier of wooden shipping containers since 1883.

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May, 19

Introducing "Formbrite"

Specially processed copper alloys with a money-saving grain structure

Formbrite is a metallurgical development of The American Brass Company applied to copper alloys, particularly brass. A special rolling or drawing process plus a special heat treatment impart a superfine grain structure to the metal.

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wire—with good ductility. It is ideal for rivets, wood and machine screws and upset products generally. A minimum tumble cleans and polishes Formbrite fastenings.

Formbrite is beyond the experimental stage. Millions of pounds have been made, sold and satisfactorily fabricated and finished. It costs no more than standard drawing or cold heading brass. If you are cold-working brass in the form of sheet, strip or wire, you will want to know more about Formbrite. Write for Publication B-39 . . . and if you'd like to compare Formbrite with ordinary drawing brass in your own polishing room, ask for the kit of two sample cups. The American Brass Company, General Offices, Waterbury 20, Conn.

Formbrite is a trademark of The American Brass Company designating copper-base alloys of exceptionally fine grain, combining unusual polishing characteristics with good strength and hardness, plus excellent ductility.

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20¢ per Copy \$2.00 per Year

Published Monthly by

KING PUBLICATIONS

609 Mission Street
San Francisco 5, Calif.
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WESTERN INDUSTRY



VOLUME XVI

MAY • 1951

NUMBER 5

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Sacred Cows Are Expensive
No Time for Fringe Items
Conservation Begins at Home

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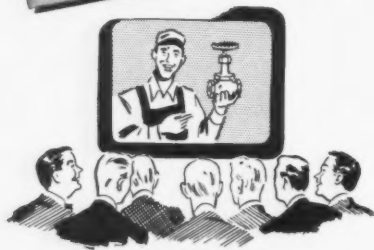
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Front Cover

It looks like a patio at the beach and cabana club, but actually it's the front entrance to one of the West's newest industrial plants, Electronic Engineering Associates, Ltd., San Carlos, Calif. This design typifies the Western trend in industrial buildings: out-of-doors "living" in eye-appealing surroundings.



PIPING POINTERS 16-mm SOUND FILM
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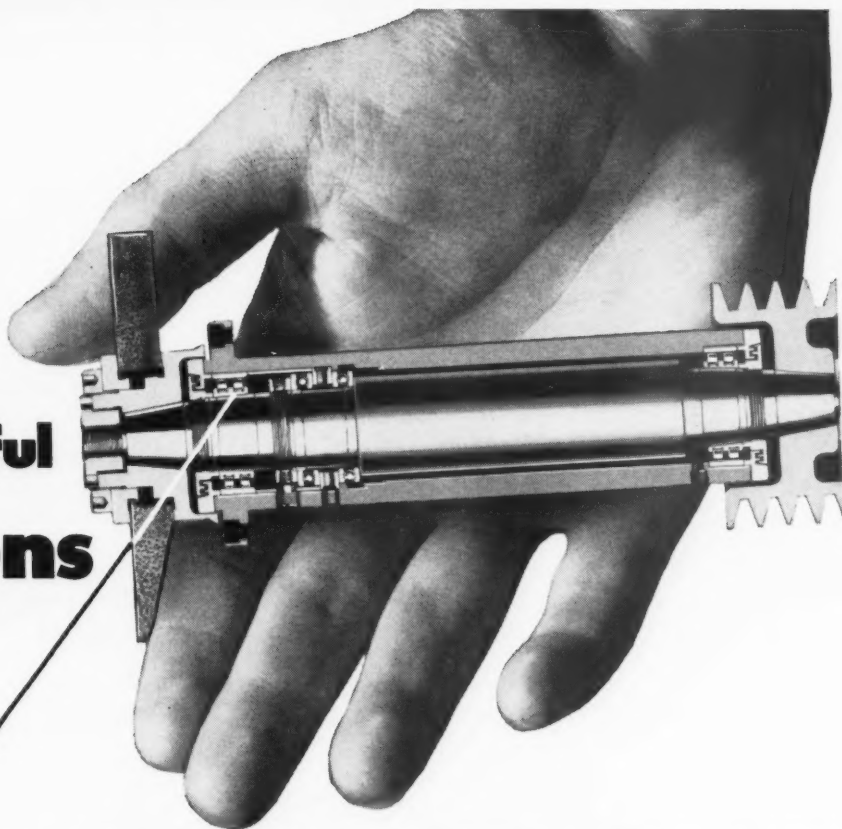
which saves time and effort in selecting valves for common piping services.

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of reasons



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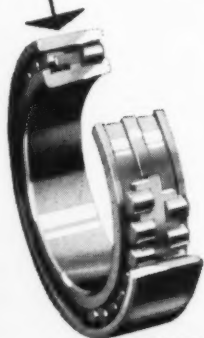
There are good reasons for this acceptance: Extra large shafts, heat-treated, stress-relieved spindle housings, sealed-in-for-life lubrication, dynamic balance after assembly.

And, perhaps most important, Pope acceptance has been helped by the use of super-precision **SKF** Cylindrical Roller Bearings to carry radial load, *separate* thrust bearings to carry thrust load.

Machine tool builders, as well as designers and builders of precision equipment for all industry, depend confidently on **SKF** to help them put the right bearing in the right place.

7222

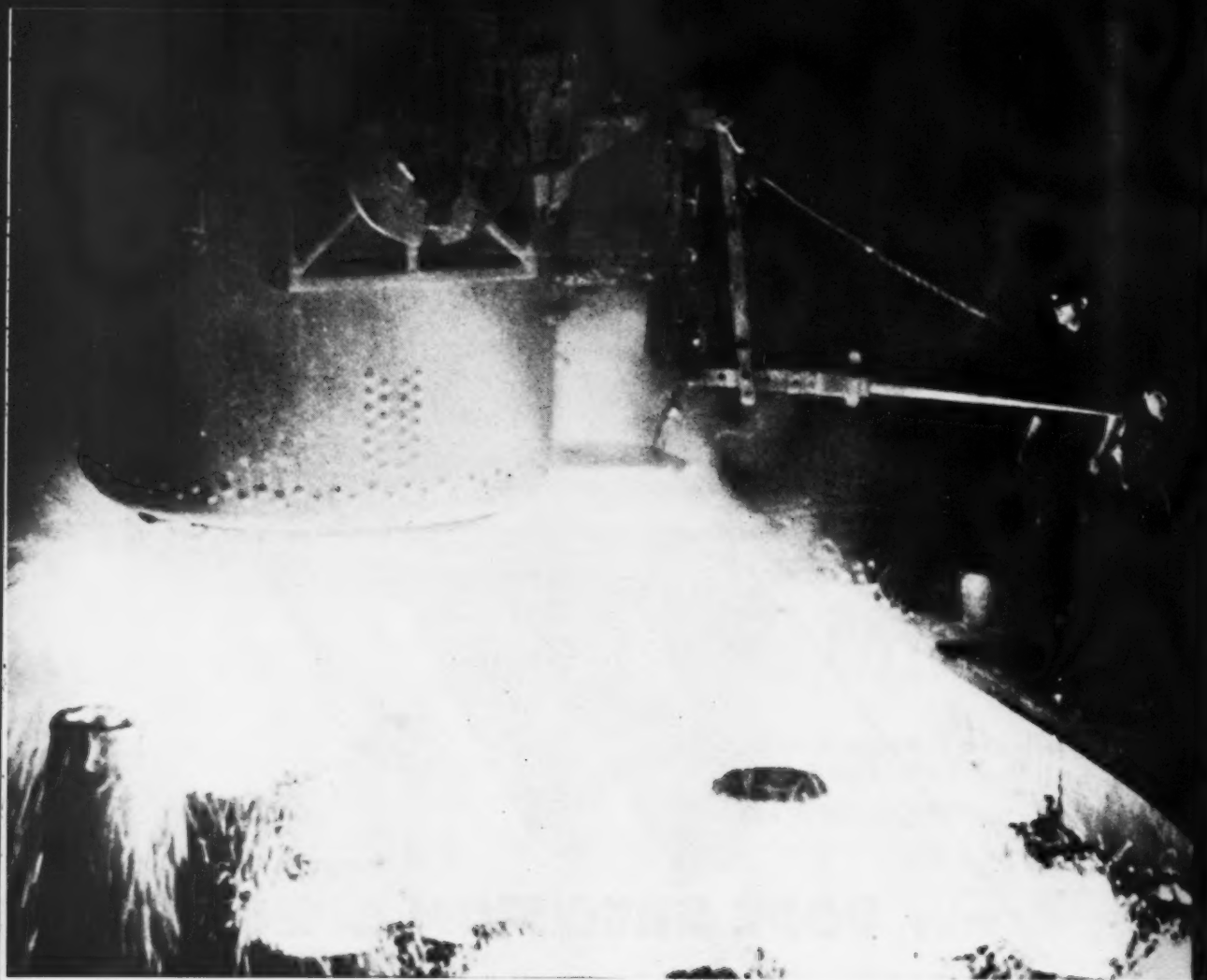
*For details and specifications covering Pope Precision Spindles, write Pope Machinery Corporation, 261 River Street, Haverhill, Mass.



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SKF

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manufacturers of
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Seventy-five years in business, warehouses and factories throughout the West for prompt local service and a real interest in your refractories' problems has made Gladding, McBean & Company the primary source of quality refractories for Western Industry.

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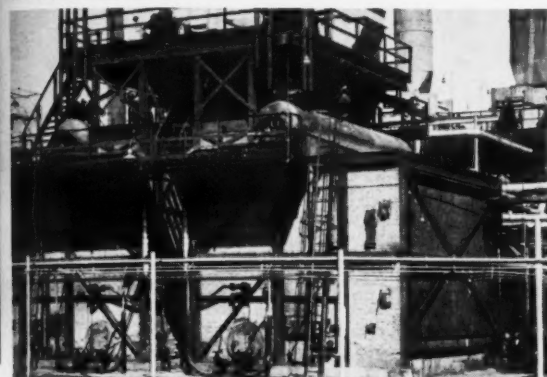
REFRACTORIES and their use in Western Industries...



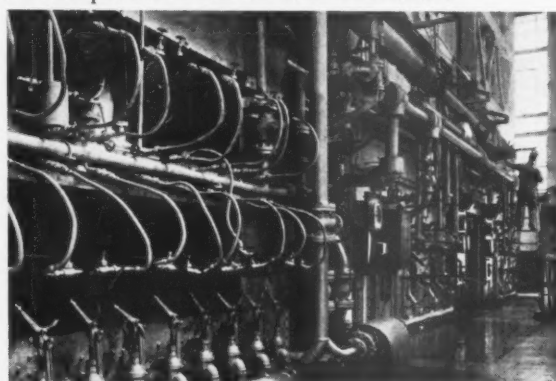
WASTE WOOD BURNERS and other large industrial incinerators rely on GMcB western made Refractories to protect fireboxes and flues.



NEW KILN over 400 ft. long used to fire porcelain sanitary ware indicates how GMcB Refractory bricks and arch shapes are incorporated in wall and roof construction.



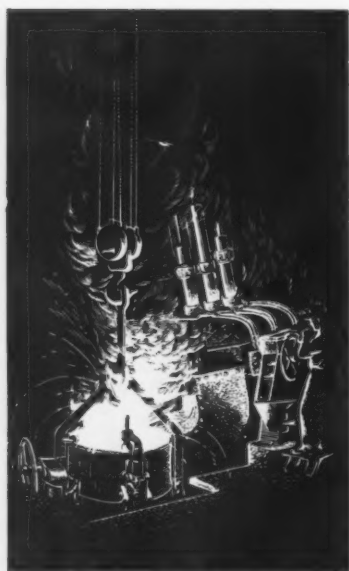
REFINERY HEATERS lined with GMcB Refractories are vital to the stills and catalytic crackers that produce gasoline, oils and solvents.



STEAM BOILERS generating power or heat for Western Industry rely on linings made from GMcB Refractories for efficient control of their intense fires.



SPECIAL SHAPES, a few of the thousands of special Refractories' shapes stocked or made to order by Gladding, McBean for use by all types of Western Industry.



Kay-Brunner **ELECTRIC FURNACE** *Steel Castings* **FOR WESTERN INDUSTRIES**

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K-B processes castings of plain carbon steels; nickel-molybdenum steels comparable to S.A.E. 4615; chrome-molybdenum steels of S.A.E. 4140 analysis and special alloys. Each casting produced contains the physical properties specified for the usage—insured by a careful analysis of every melt poured.

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**Low Cost
Permanent
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Industrial Need**

Fire-safe, weathertight, *permanent* Butler Buildings are quickly erected in days instead of weeks. Straight sidewalls and clearspan construction mean full usable space at lower cost per square foot. For complete sales and erection service, see your Butler dealer.



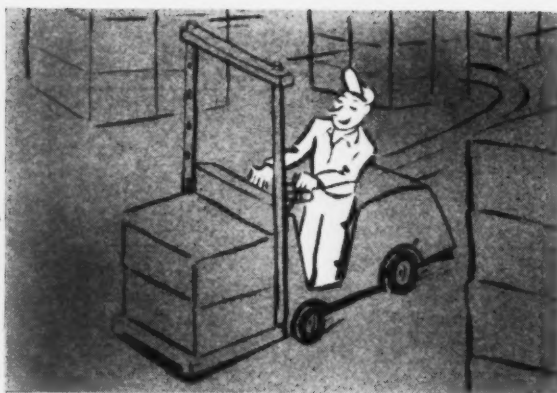
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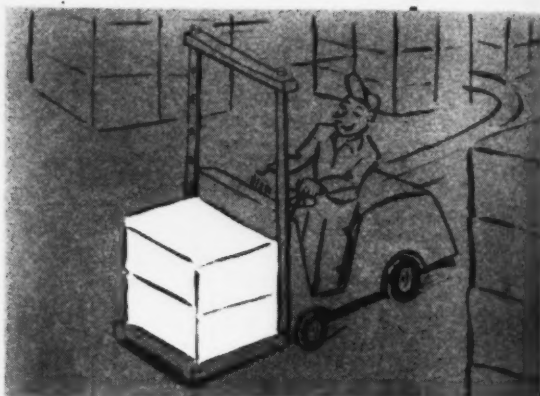
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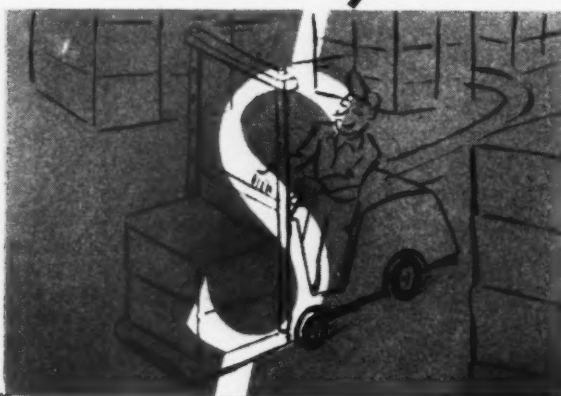
EASES THE RIDE



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MONARCH
RUBBER COMPANY

250 LINCOLN PARK • HARTVILLE, OHIO

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Monarch's tough Mono-Cushion Tires knock your vehicle maintenance costs way down, because they absorb more shock and shock load than any other type of industrial tire, size for size. They reduce floor wear, reduce load breakage, keep drivers happy. To top it off, Mono-Cushions give you low tire costs, too.

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Pacific...

SCIENTIFIC CO.

**SPECIALISTS
IN
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and TESTING
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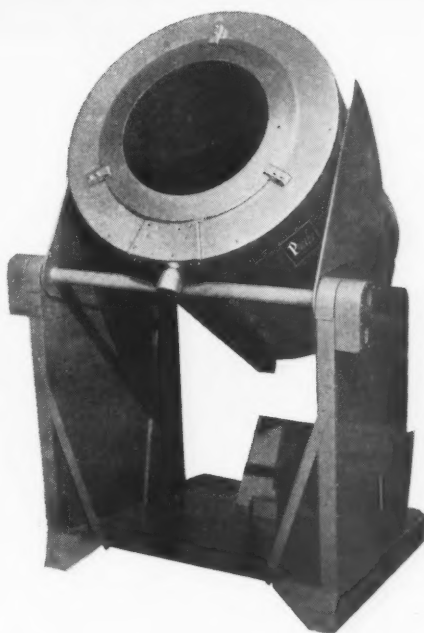
This is the No. 3042 automatic, electric, tilting furnace, designed and manufactured by Pacific Scientific Company in their Los Angeles plant. Built for McCulloch Motors, this furnace replaces previous gas fired equipment. It is used in melting magnesium and serves to supply a Pacific transfer furnace which in turn travels to the Pacific holding furnace from which metal is ladeled for each die-casting shot.

Constructed with Hevi-Duty type overbend elements and parabolic type refractories with a capacity of 1,000 lb., with 400 lb. breakdown per hour with a molten starter.

Thermocouple regulation holds metal to extreme close temperature tolerance, which in actual operation, has contributed to amazing records in low reject count, with better castings and cleaner metal.

Noiseless, fully automatic in operation, this furnace has provided better fire protection and working conditions with complete speed regulation PLUS a better product.

**If you have a metal heating or treating problem
call our nearest office for prompt assistance.**



*For product information
from these manufacturers
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Photo by Josef A. Schneider

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It's like this, see? For example, a train-load of freight cars comes rolling in to North Platte, Nebraska. Some cars are headed for one place, some for another. First we pull 'em apart. Then we put together those cars headed for the same destination.

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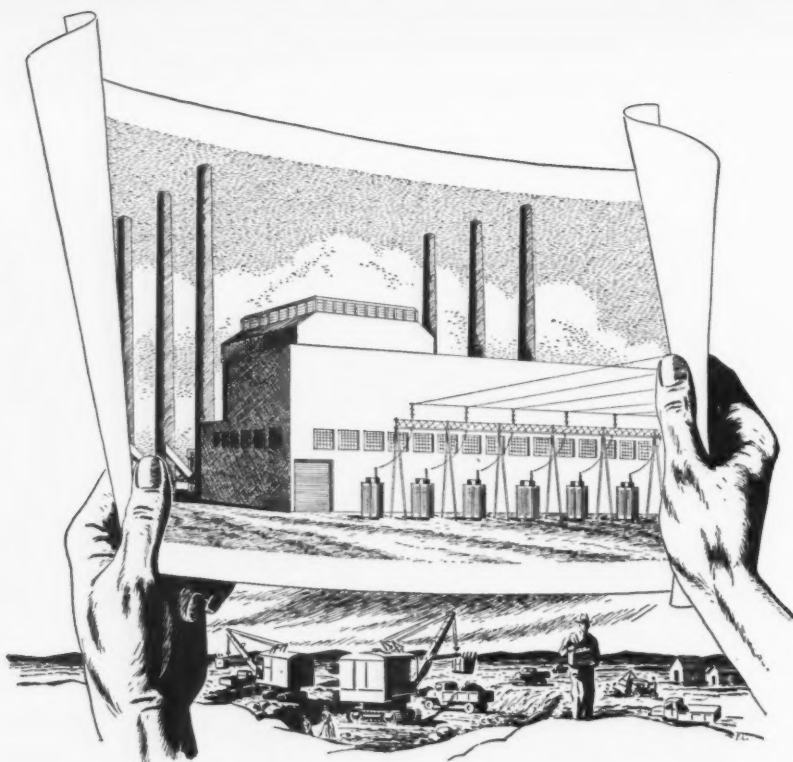
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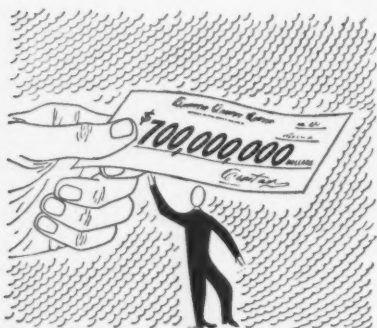
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What it took to double your power supply in just six years!

Long-range planning is the key to power expansion, for it takes years to build new powerhouses. Thanks to continuous planning, P. G. and E. was able to

launch its construction program immediately after the war and has doubled its capacity in less than six years—from two to four million horsepower!



Lots of money—more than seven hundred million new dollars—has been put to work since 1945 to build added facilities to supply electricity and gas in this fast-growing area. The new capital needed has been provided by vast numbers of people who invested in P. G. and E. securities.



Plenty of men—construction crews totaling many thousands—have teamed up to build the nine new power plants and the thousands of miles of lines added to the P. G. and E. network. To bring a powerhouse to life requires many skills, including engineers, electricians, cooks, linemen and others.



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P. G. and E.

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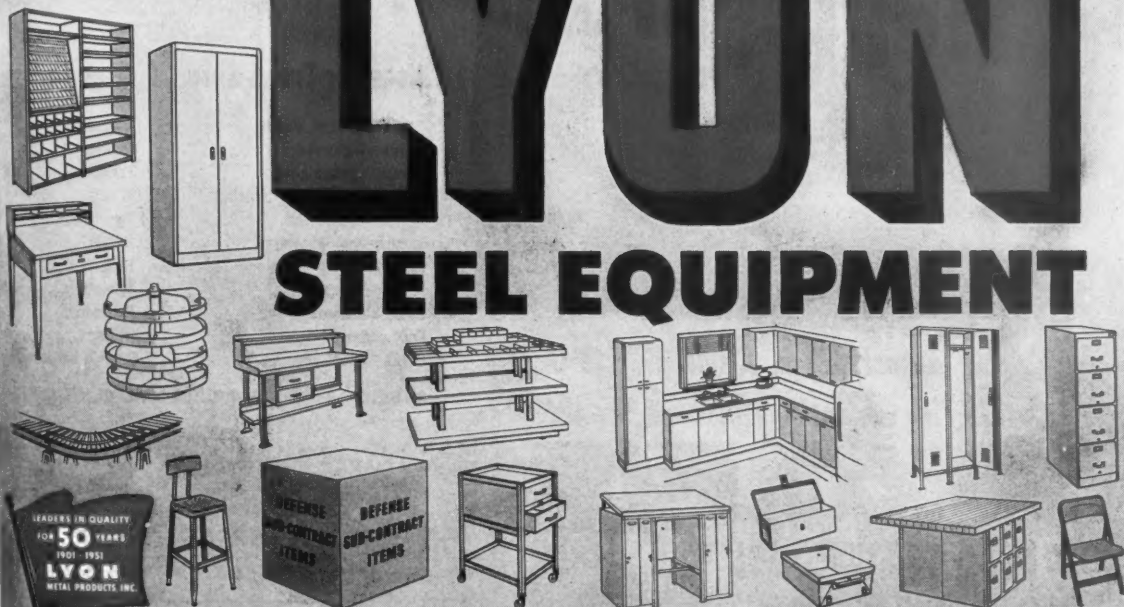
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Shipment from Pacific Coast Points

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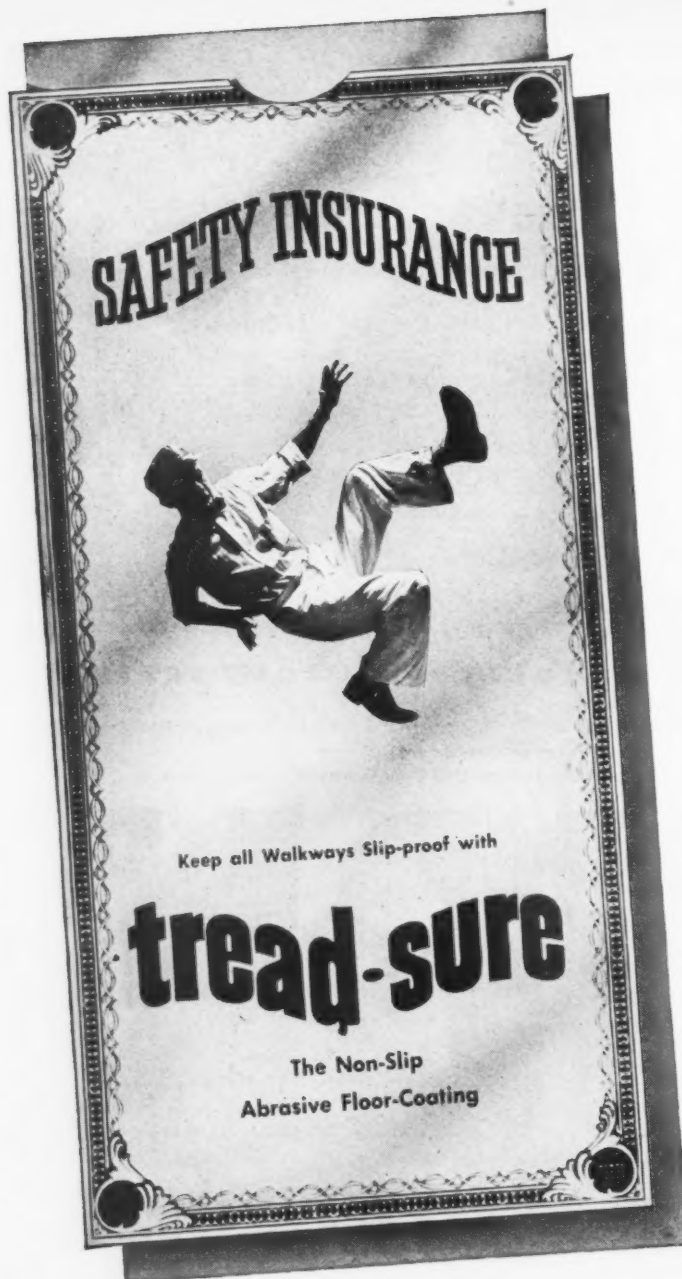
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STEEL EQUIPMENT



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- Stools
- Bin Units
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- Cabinet Benches
- Storage Cabinets
- Welding Benches
- Conveyors
- Bar Racks
- Tool Boxes
- Parts Cases
- Economy Locker Racks
- Flat Drawer Files
- Toolroom Equipment
- Wood Working Benches
- Display Equipment
- Drawing Tables
- Revolving Bins
- Hanging Cabinets
- Filing Cabinets
- Folding Chairs
- Work Benches
- Bench Drawers
- Service Carts
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- Shop Desks



Horn Tread-Sure produces a heavy long-wearing anti-skid surface on wood, concrete or steel. Tread-Sure is an abrasive filled brush-coating, simple and inexpensive to apply on any size area.

Tread-Sure is resistant to gasoline, alcohol, oil, grease, detergents, industrial waste and many types of acids. Tread-Sure provides a non-skid safety footing, giving the worker confidence and security by reducing accident hazards.

Tread-Sure maintains traction and resiliency and is comfortable to stand on. Designed for exterior as well as interior use, it may be brush applied over other paint or direct to unpainted surfaces. Used as it comes from container. Three non-glare colors—Battleship Grey, Red, Green.

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Grease racks—work benches
Running boards
Washrooms—showers
Elevator floors—landings
Machinery platforms
Scale platforms
Foot pedals
Decks—hatch covers

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Food, Milk,
Meat Plants,
Hotels,
Hospitals,
Schools,
Railroads,
Utilities,
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WI-51

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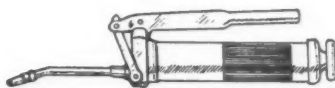
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For ALL automotive grease applications...

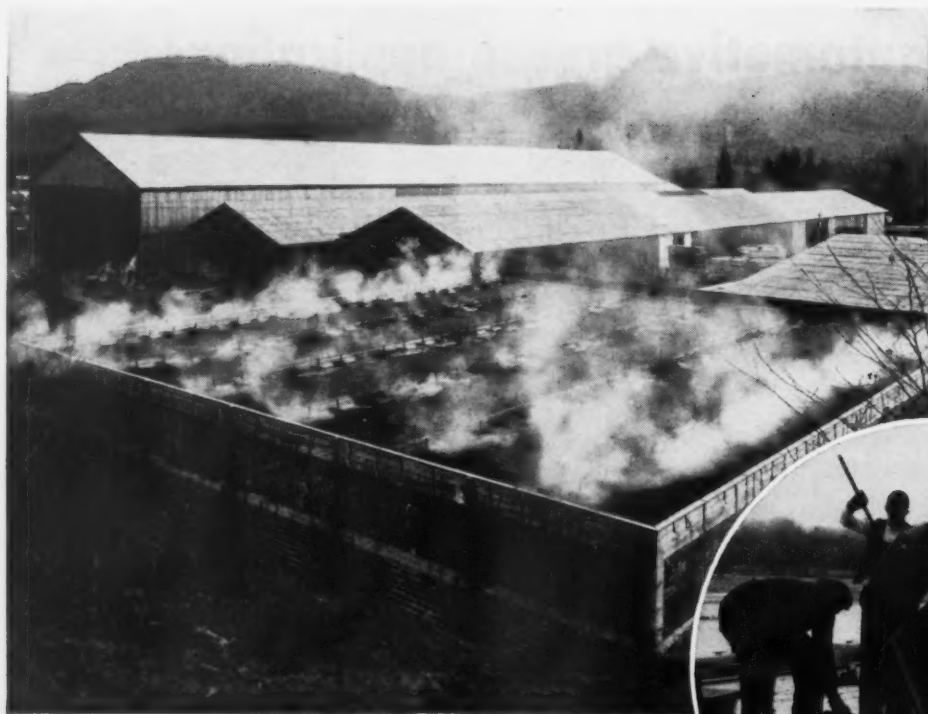


SHELL RETINAX A lubricates
Wheel bearings • Universal joints
Water pumps • All chassis points



AND DOES A BETTER
JOB THAN SPECIAL-
PURPOSE GREASES!





Steam emanating from Fischer Lumber Company's dry kiln, Marcola, Ore.

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Ira O. Williams
Roofing Company

Roof Deck:
Poured Concrete

Insulation:
Fiberglas Roof
Insulation



Saves Fuel...AND ROOF MAINTENANCE COSTS

Here's an application that proves FIBERGLAS* ROOF INSULATION's superiority. Interior temperatures in the pictured dry kiln ranging from 150° to 190° F. and yet . . . ICE STILL FORMS ON TOP OF THE ROOF!!

You'll find Fiberglas Roof Insulation excellent for severe conditions of this nature. We'll gladly certify to its insulating value as listed below:

Thickness of Board	1/2"	3/4"	1"	1 1/4"	1 1/2"	2"
Thermal Conductance	.50	.33	.25	.20	.17	.13

These exceptionally low thermal conductances mean SUBSTANTIAL SAVINGS IN FUEL CONSUMPTION TO YOU. Lower roof maintenance costs are assured, too.

Made of ageless FIBERS of GLASS which are unaffected by possible dampness, Fiberglas Roof Insulation will not rot or decay, swell or shrink. Other plus values: INCOMBUSTIBLE—LIGHTWEIGHT and EASY TO HANDLE—PROVIDES HARD, SMOOTH MOPPING SURFACE.

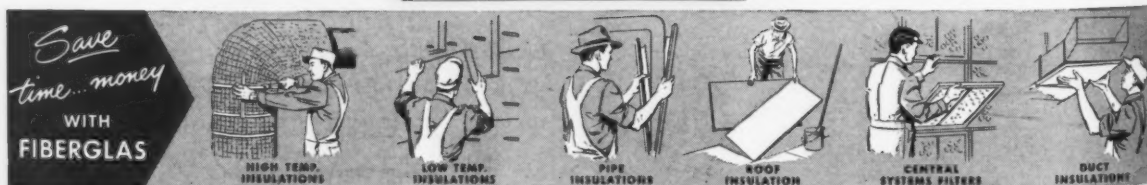
Fiberglas Roof Insulation is handled only by leading roofing contractors. For name of local source and complete information, phone the Fiberglas branch office nearest you or write to OWENS-CORNING FIBERGLAS CORPORATION, Box 113E, Santa Clara, Calif.

WESTERN STATES SALES OFFICES: Albuquerque, Denver, El Paso, Eugene, Fresno, Los Angeles, Phoenix, Portland, Sacramento, Salt Lake City, San Diego, San Francisco, San Jose, Seattle.

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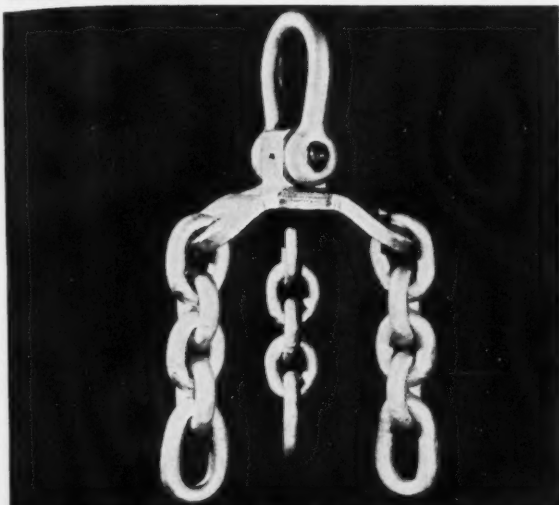
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*Fiberglas is the trade-mark (Reg. U. S. Pat. Off.) of the Owens-Corning Fiberglas Corporation for a variety of products made of or with fibers of glass.

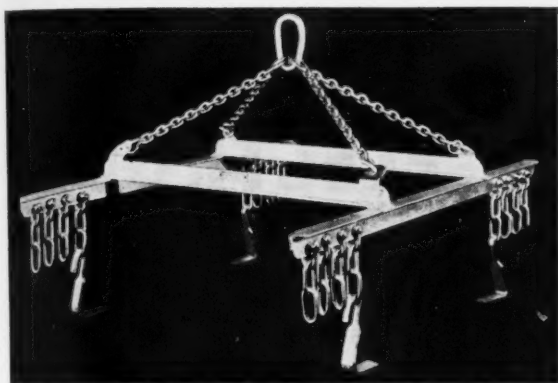
ROUND Chain solved these problems!



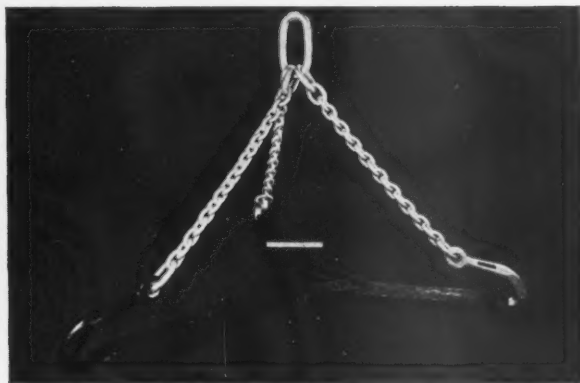
ROUND Special Magnet Chain. Top plate keeps 3 attachment chains in proper locations . . . prevents excessive wear on end links. Sling shackle has bronze bearing with lubrication fitting.



ROUND Adjustable Plate Sling. Handles steel plates in 4-5 or 6 ft. widths. Eliminates necessity for changing slings on warehouse cranes for different plate widths.



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ROUND Cupola Sling. Speeds moving of cupola lids. Hooks have square ends and flat sides to fit securely into lid sockets.

In addition to the complete line of ROUND Chain of all sizes and types, ROUND Associate Chain Companies design and make special chain assemblies to meet every individual need. A few typical units are pictured above.

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Los Angeles 54, Cal.

The Bridgeport Chain & Mfg. Co., Bridgeport, Conn. • The Cleveland Chain & Mfg. Co., Cleveland, Ohio • The Round Chain & Mfg. Co., Chicago, Ill. • The Southern Chain & Mfg. Co., Birmingham, Ala. • Woodhouse Chain Works, Trenton, N. J.



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AIRCO THOR-TUNG ELECTRODES

Here's a tungsten electrode that's especially designed for all positions on straight polarity, DC Heliwelding on stainless steel, copper, mild steel and aluminum, using Heliwelding, Airco's inert gas arc welding process. Made with thoriated tungsten, long-noted for its excellent electron emission characteristics, Airco Thor-Tung offers these advantages —

IT DOESN'T MELT . . .

Airco Thor-Tung does not "ball up" at the end of the electrode nor does it sputter off into the puddle when subjected to high arc welding temperatures — because of its cool operating characteristics, longer life is obtained from each electrode.

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Airco Thor-Tung permits the operator to "touch-start" directly on the work without contaminating the work or the electrode. Uncontaminated

electrodes increase production and result in better welds.

EXCELLENT ARC STABILITY . . .

One of the keys to consistent weld quality and ease of operation is good arc stability. With Airco Thor-Tung, the arc is very stable and does not wander or climb up the electrode even at low currents. Touch starting is made easy even with currents as low as 15 Amperes. The better stability of these electrodes enables a given size to be used over a wider range of currents.

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Thor-Tung's permanency, ease of operation and stability make it the most economical electrode for straight polarity, DC Heliwelding.

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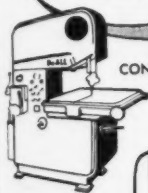
A Division of Air Reduction Company, Incorporated

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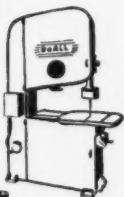
Western Headquarters for Oxygen, Acetylene and Other Gases . . . Carbide . . . Gas Welding and Cutting Machines, Apparatus and Supplies . . . Arc Welders, Electrodes and Accessories

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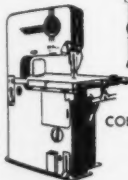
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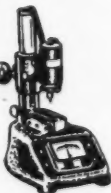
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GAGE ACCESSORIES



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SAW BANDS



National Acme Company, Cleveland, reduces cost of cams and gears. One of the first steps in production of Acme cams is splitting the ring shown above into segments. DoALL MP-20 makes cut through $9\frac{1}{4} \times 1\frac{1}{8}$ " wall thickness in three minutes.

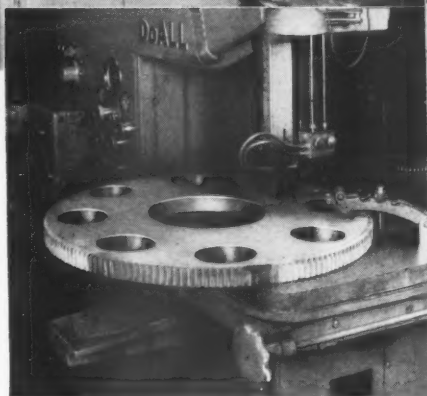
It's EASY TO SAVE . . .

MANPOWER — Hydraulic controls and power feed simplify operation and increase output. Operators attain skill in short time. Reduces labor cost.

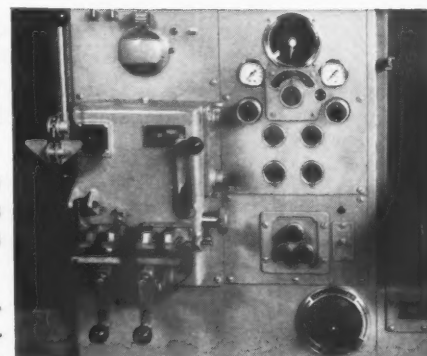
MACHINE POWER — Preliminary metal removal and shaping by hydraulic powered band machining technique saves time of more costly machines. Expanded speed range and new Band Tools cut any material.

MATERIAL — Band Machining technique cuts directly to layout line, removing surplus metal in usable form in record time. Reduces scrap loss — less chips, less waste.

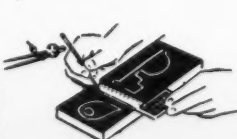
SEE IT DONE ON THE MODEL MP-20 — Ask our Machine Tool Specialist to demonstrate the CONTOUR-MATIC Band Machine that creates entirely new manufacturing possibilities.



Tough alloy gear $1\frac{1}{4}$ " thick is split in 16 minutes "floor to floor time." MP-20 provides required band speed and feed pressure.



Centralized operating panel controls speed of tool, feed pressure of table, welding the tool, and coolant facilities.



TOOL STEEL



BENCH FILER

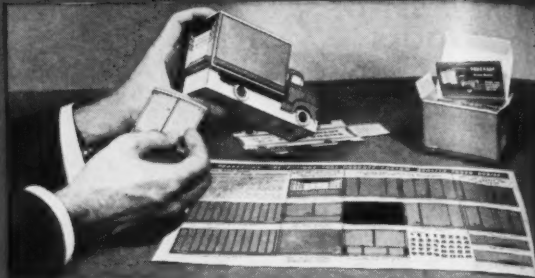


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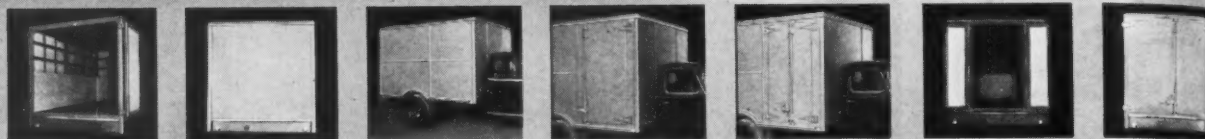


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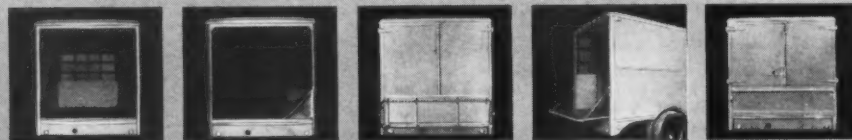
*are custom-fitted to your job...
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Fruehauf Model Kit lets you "make up" your body—with all options—in miniature.



1. Open Top 2. Solid Rear End 3. Solid Sides 4. Single Side Door 5. Double Side Door 6. Narrow Double Rear Doors 7. Full Width Rear Door



8. No Rear Door 9. Express Gate Rear 10. Tailgate (Outside Type) 11. Tailgate (Flush Type) 12. Tailgate (Doors Above)



Count all the advantages of buying a Fruehauf before you consider any other Truck Body:

1. Over 500 options.
2. All steel, "Unit-Built" construction.
3. Straight frame or wheelhousing ... all popular lengths.
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10949 Harper Avenue • Detroit 32, Michigan

IN OUR MAILBOX

Page by Page . . .

Editor, *Western Industry*:

Your March 1951 issue of *Western Industry* has reached my desk, and I have gone through it page by page. I want to take this opportunity to congratulate you on a mighty fine issue.

You certainly are doing a job in portraying Western industry, and I am confident that industry is conscious of this fine work and will continue to support your splendid efforts.

The Western Metal Congress and Western Metal Exposition are both very appreciative of the publicity you have given to this seventh activity held in the interest of the West by the American Society for Metals in cooperation with the Western sections of twenty national technical societies.

Please accept our thanks and congratulations.

W. H. EISENMAN, Secretary,
Western Metal Congress and
Exposition
Oakland Civic Auditoriums
Oakland, California.

* * *

An Aid to Contemplation

Editor, *Western Industry*:

I listened to Chet Huntley's radio program last Tuesday evening (Jan. 30th) in which he read from *Western Industry* magazine. I've searched all the newstands, but have been unable to buy a copy. Can you send me a copy of your January issue?

I want to send the magazine to an Eastern business man who is contemplating locating out in this area.

MRS. E. H. BURWELL
Cathedral City, California.

* * *

Subcontract Know-How

Editor, *Western Industry*:

As usual you have put your finger on a need, as described in your article in the February issue on "Here's The Know-How To Get Aircraft Subcontracts," and have offered constructive advice on how to fill that need.

We should like to call favorable attention to it in the next issue of our "Production Expediter" and for those who do not regularly receive *Western Industry* we should like to make this article available to them.

Can reprints be obtained and, if so, what would be the cost?

A. P. WESTLUND
Industrial Consultant
Business Agent's Division
Department of Water
and Power
The City of Los Angeles

* * *

Editor, *Western Industry*:

Would you kindly enter my subscription to *Western Industry*? I would like very much to have the February issue containing articles on electroplating and sub-contracting.

I am the president and chief engineer of this corporation, which is engaged in manufacturing electronic counters and computers.

HERBERT B. BROOKS
Condor Radio Mfg. Co.
Prescott, Arizona.

EDITORIAL COMMENT

Sacred Cows Are Expensive

IN A GOOD MANY cases Eastern top management could save themselves considerable money by inviting the criticism and comment of their Western branch executives on engineering installations beforehand, to say nothing of permitting it afterward. All too often the idea prevails that branch management judgment is inferior, and therefore the Western executives, like small boys, should be "seen and not heard."

The results of such policies are apt to be expensive. For example, just the other day we heard of a case where upwards of a thousand dollars were literally going down the drain every month, because the branch executives did not feel at liberty to report that an installation had been faultily designed. If we polled our readers, doubtless we could find many similar instances.

No Time for Fringe Items

FRINGE ITEMS should not be allowed to creep into wage increases permitted under emergency wage regulations, says the Industrial Conference Board of Tacoma in a timely letter to Eric Johnston. "If our people are to be closely regulated as to the price at which they can sell their goods and services, then there must be corresponding limits on their wage costs."

The letter points out that so-called "health and welfare" costs have no limit and can go as high as new and greater benefits can be conceived, while pensions present an insurmountable problem in small employer units. It further notes that a squeeze of the employer between tight price controls and unlimited wage cost demands can reflect harmfully to the employee in enforced unemployment.

Conservation Begins at Home

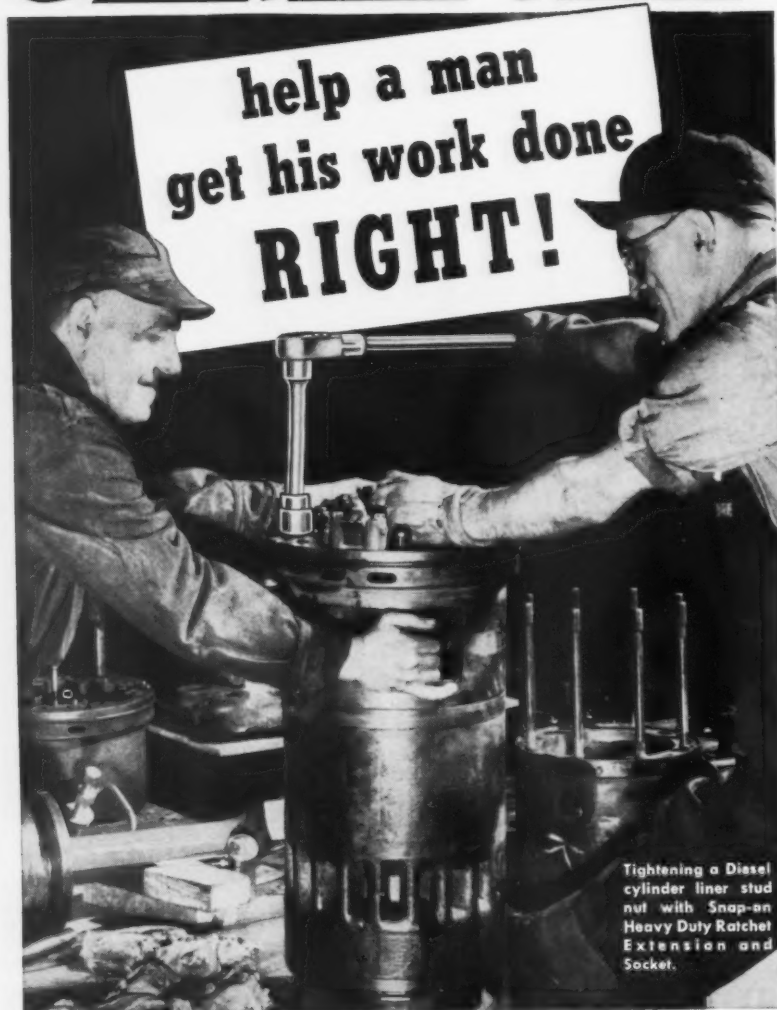
REAL water conservation eventually will have to begin on the farm and in the industrial plant. Just building more dams to store more water, or sinking more wells, will never meet the needs of the growing West if the water is wastefully used.

If farmers and industrialists would stop to think of it, every gallon thrown away has to be paid for in some manner. If the water comes from storage reservoirs, there will have to be more and bigger dams—provided the water is available to fill them—and the cost will come to roost eventually in the form of income tax, despite the delusion that you don't have to pay for things the government does for you. If wells are the source of supply, the water table will fall proportionately with the wastage.

It is all very well to reason that "another thousand gallons wouldn't do us any harm," and to ignore practical measures such as the re-use of water and pumping it back into the ground rather than wasting it away into the sewer, but the day of reckoning will come. And days of reckoning are invariably exceedingly painful.

In time to come there will undoubtedly be governmental control of water-using practices, unless industry's nose is so clean that it will be unnecessary. It would be the height of folly to presume that agriculture would have to face the question of control before industry.

Snap-on^{*} Tools



Tightening a Diesel cylinder liner stud nut with Snap-on Heavy Duty Ratchet Extension and Socket.

● On the high iron, the highways and the high seas, Diesel maintenance goes faster, surer, with Snap-on Professional Tools. *Stands to reason!* Snap-on Tools are engineered for the tool-crib, instead of the store counter. For men to *use*, and *use hard*. They're husky where it counts most, slim and trim to reach into tight spots. Their toughness comes from *core-to-surface* tempering. They'll serve longer, cut your tool costs, cut down-time! Close-at-hand service to industry everywhere through 41 direct factory branches. Write for Snap-on Industrial Catalog and 104-page General Catalog.

^{*}Snap-on is the trademark of Snap-on Tools Corporation.

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Kenosha, Wis.



CALENDAR OF MEETINGS

May 16-18—Northwest Electric Light & Power, at Davenport Hotel, Spokane. Contact Berkeley Snow.

May 21-22—Forest Products Research Society, Regional Meeting, Empress Hotel, Victoria, B. C. Contact Carl A. Rasmussen, Research Lab., Western Pine Assn., 7733 S.E. 13th Ave., Portland, Oregon.

May 24-26—Washington Motor Transportation Assn., at Davenport Hotel, Spokane. Contact Mr. Carleton (MA 7131).

May 31-June 1—Western Forest Products Safety Conference, at Multnomah Hotel, Portland. Contact E. H. Crosby, Columbia River Loggers Assn., Portland. BR 0479.

June 6—Second Annual Manufacturers' Conference, in Oakland. Contact W. H. Oliver, Oliver United Filters, Inc., 2900 Glascock St., Oakland 1, Calif. KEllog 3-3636.

June 7-9—Rocky Mountain Coal Mining Institute Convention, at Hotel Utah, Salt Lake City. Contact Walter F. Clarke, Gen. Mgr., Independent Coal & Coke Co., Salt Lake City.

June 10-13—Triple Industrial Supply Convention, at San Francisco. Contact Exec. Secy. Natl. Supply & Machinery Distributors Assn., H. R. Rinehart, 505 Arch St., Philadelphia 6, Pa.

June 11-12—Pacific Northwest Section of American Association of Cereal Chemists, at Davenport Hotel, Spokane. Contact Mr. Montzhermeir (KE 2636).

June 15-30—First Seattle International Japanese Trade Fair, Seattle, Wash. Contact Robert Story, Mgr., World Trade Division, Seattle Chamber of Commerce, Seattle.

June 18, 19, 20—SPI Pacific Coast Chapter Conference, The Society of the Plastics Industry, at Tahoe Tavern, Lake Tahoe, Calif. (Note date change from June 14, 15, 16.) Contact Langdon P. Williams, SPI, Inc., 295 Madison Ave., New York 17, N. Y.

June 19—Institute at Oregon State College, special public session on Northwest Resources Mobilized for National Defense and Security, Oregon State College, Corvallis, Oregon. Contact Dr. J. Granville Jensen, O. S. C., Corvallis.

June 24-28—Pacific Coast Paper Box Manufacturers Assn., 1951 Convention, at Empress Hotel, Victoria, B. C. Contact J. N. Mills, Exec. Sec., 672 So. Lafayette Park Place, Los Angeles (DU 3-0221).

June 24-29—American Pulp & Paper Mill Superintendents Assn. national meeting at Multnomah Hotel, Portland. Contact R. B. Morden, Morden Machines Co., Pacific Bldg., Portland. BE 9354.



... new customers of Kaiser Steel

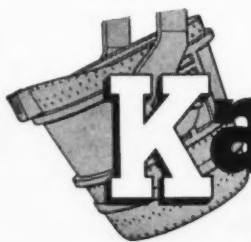
TODAY, Kaiser Steel is riding on the front and back of 5 million California cars—in the form of 1951 license plates.

This emphasizes once again that western steel—Kaiser Steel—is geared to meet western needs. Not only for license plates, but also for products ranging from armament to bridges, from appliances to farm implements, from stoves to line pipe.

Not long ago nearly all steel for the West had to be shipped in from distant production centers. But today, because of Kaiser Steel's expanded production facilities, more and more steel is produced in the West for the West.

More evidence that the West Coast's only integrated *independent* steel plant is helping to build a stronger West . . . and a stronger nation!

It's good business to do business with

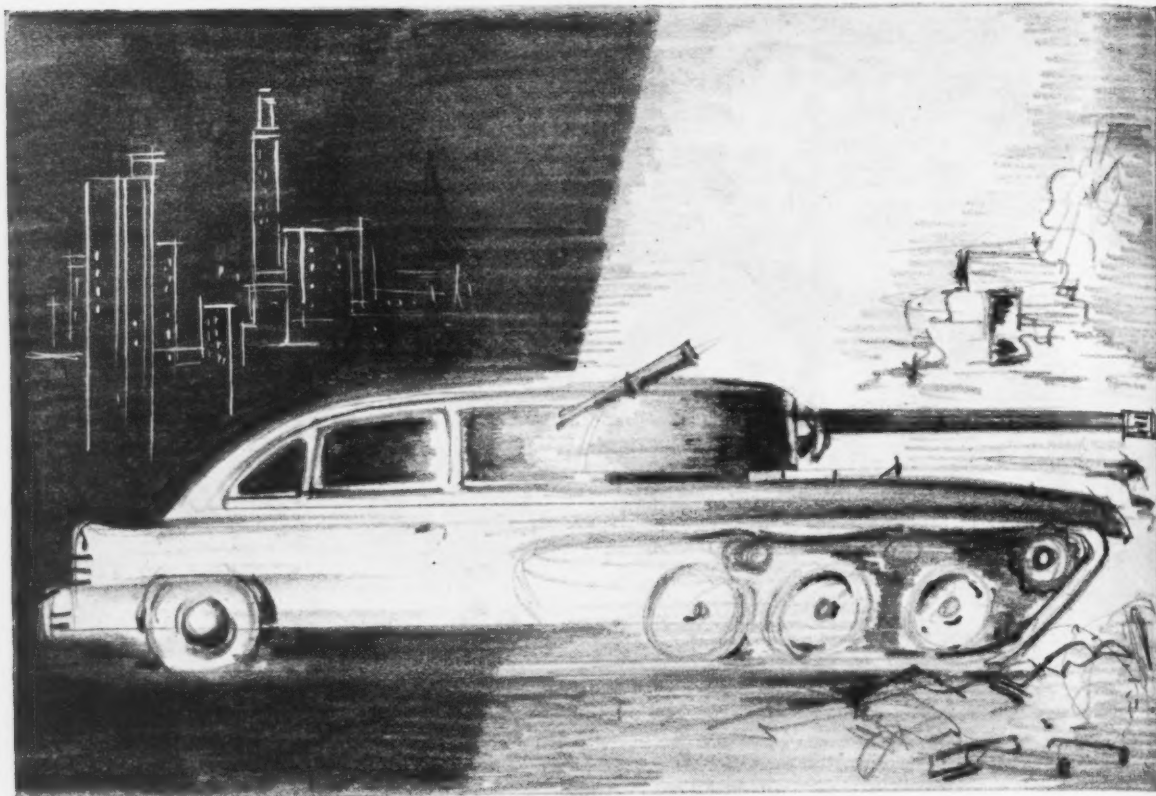


Kaiser Steel

built to serve the West

PROMPT, DEPENDABLE DELIVERY AT COMPETITIVE PRICES • plates • continuous weld pipe • electric weld pipe • hot rolled strip • hot rolled sheet • alloy bars • carbon bars • structural shapes • cold rolled strip • cold rolled sheet • special bar sections • semi-finished steels • pig iron • coke oven by-products

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Helping You Shift TO DEFENSE PRODUCTION

Practical solutions to the complex problems that accompany the switch to defense work can often be found at your nearby Ryerson Plant. Experienced Ryerson steel men will gladly work with you. Not only can they help you select the right steels for the job at hand, but they are well-informed on military specifications and the latest government procedures.

When you want steel quickly for building experimental or pilot models—for bridging the gap between initial and full-scale production, we suggest you check with Ryerson. Though kinds and sizes most in demand are not always available for prompt shipment, we do have a large tonnage of steel on hand at thirteen strategically located plants.

So call us for steel—and steel information. We can't promise to fill all your steel requirements, but we can assure you that we will do our very best to help.

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CARBON STEEL BARS—Hot rolled and cold finished

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WESTERN INDUSTRY



For Worker Efficiency and Community Approval—

MAKE YOUR NEW PLANT EASY ON THE EYES

FUNCTIONAL PURPOSE is the basis of design in the new Sierra Electronic Building on Brittan Avenue in San Carlos, Calif. The two-story Stretcrete unit was designed by the office of Francis Joseph McCarthy, AIA, San Francisco, to house three organizations: Sierra Electronic Corp., Sierra Electronic Manufacturing Co., and Electronic Engineering Associates, Ltd. The interdependency of these organizations, as well as their various and specialized functions, are expressed in the plan and character of the building.

Easy On the Eyes Inside

Sierra Electronic Corp. is primarily a development company, which has been located in a frame building since its formation in 1947. At the old location, administrative offices, laboratory, drafting room, and shop areas were separated physically with resulting difficulties in communication, supervision, and general liaison.

As the plan of the new building shows, this development group occupies the ground floor with offices at the Northeast wing. These directly adjoin the large laboratory and drafting room, which in turn communicate directly with the machine shop, metalshop, stockroom, spray-painting, assembly, and testing areas.

Even more important than communication in the scheme is good light-

ing because of the intricate nature of the assemblies and components handled here. The long narrow plan permits very high levels of daylight illumination from the high windows placed along both sides. This is augmented by carefully-placed cold-cathode fixtures. The result can be seen in

the accompanying photos, many of which were taken without the addition of any photographic lights whatever. With regard to natural lighting which is usually used to provide general illumination in the average industrial plant, the work areas on both floors receive their major amount of natural

This Industrial Plant a Candidate for Honor Awards

FROM THE STANDPOINT of beauty as well as of function, the architecture of the building described in this article is significant. Of the industrial plants designed this past year in the offices of Francis Joseph McCarthy, this one was selected to be entered in the third national competition for Honor Awards this year, sponsored by the American Institute of Architects in Chicago.

Being easy on the eyes inside (through good color combinations and lighting techniques) is a distinct employee benefit. Being easy on the eyes on the outside (through color combinations and planned landscaping) is a distinct community benefit. Both were prime architectural considerations from the start.

Frank G. Belcher, president of Electronic Engineering Associates, Ltd., and owner of the building, believes that any industrial plant has the civic responsibility to maintain an industrial area of beauty, as well as the community responsibility to furnish employment to the residents and taxes to the government.

This is the second in a group of articles in *Western Industry* having to do with new plant construction, wherein the basic architectural considerations and planning are discussed. First article appeared last month, describing these points in the Arrowhead Rubber Company plant, at Downey, California.



Air view of the new plant. This particular site was chosen for its area (considerable expansion is envisioned for the three firms occupying the building), and for accessibility (over paved main streets). A railroad spur is available on either side of the plant.

light from the north, the most constant light, and have no windows to the west, to avoid the end of the day sun glare.

In the first floor work areas the high windows to the south open into washrooms, the superintendent's offices, and parts and spraying; and in all of these areas some sunlight is not objection-

able. On the second floor in the work area the high windows to the south are protected from the sun by the deep roof overhang. It is significant to point out that both work areas have cross light.

As to artificial illumination, which was laid out to requirements set by the tenants, the work areas in each floor

are lighted by fluorescent lights strategically placed over each work bench and piece of machinery. These fixtures have also been so spotted and are in sufficient quantity to give adequate general illumination for night work.

Making the Most of Light

To make the most of the light supplied, the concrete curtain walls in the work areas are painted a light reflecting soft light green, matt finish and the ceilings are fibreboard. Ceilings are an "off-white" light reflecting matt finish. Glare has been eliminated as far as possible by reducing enamelled surfaces to a minimum. The balance of the painted or stained areas are in a medium gray.

The related office areas on both floors have large windows to the east as their natural light source, the windows on the second floor being protected from over-glare by the large roof overhang and on the first floor by the full length balcony overhang. In only two offices, one on each floor, which have a window to the west, was a venetian blind required.

In every case the offices are provided with numerous base outlets for any special desk lighting required, and very adequate general illumination is

Important Points to Remember for Plant Lighting

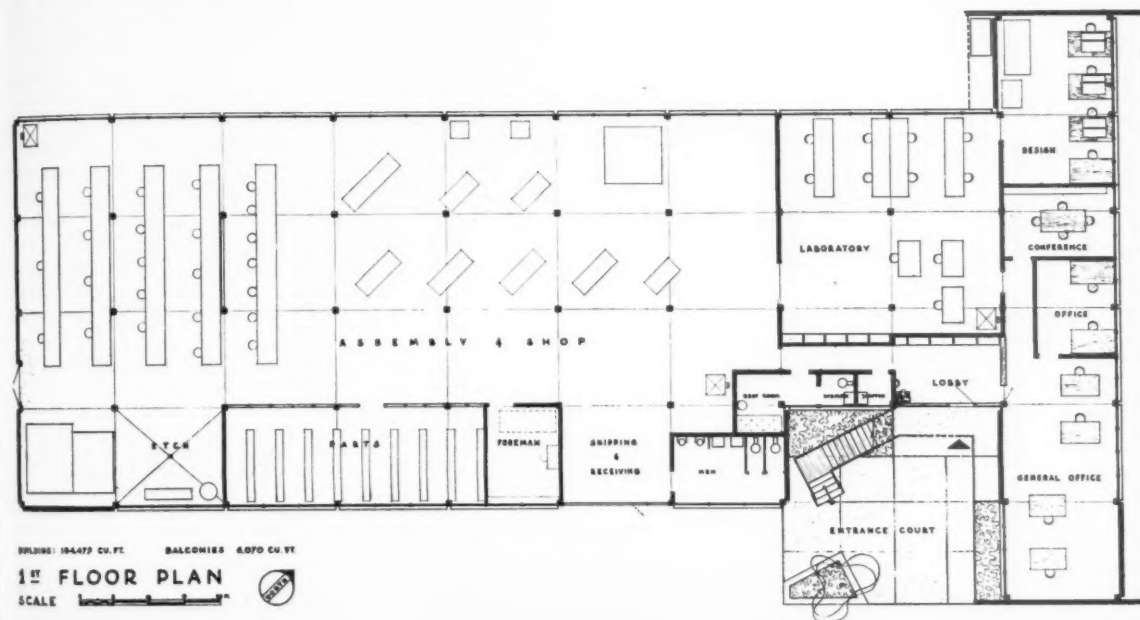
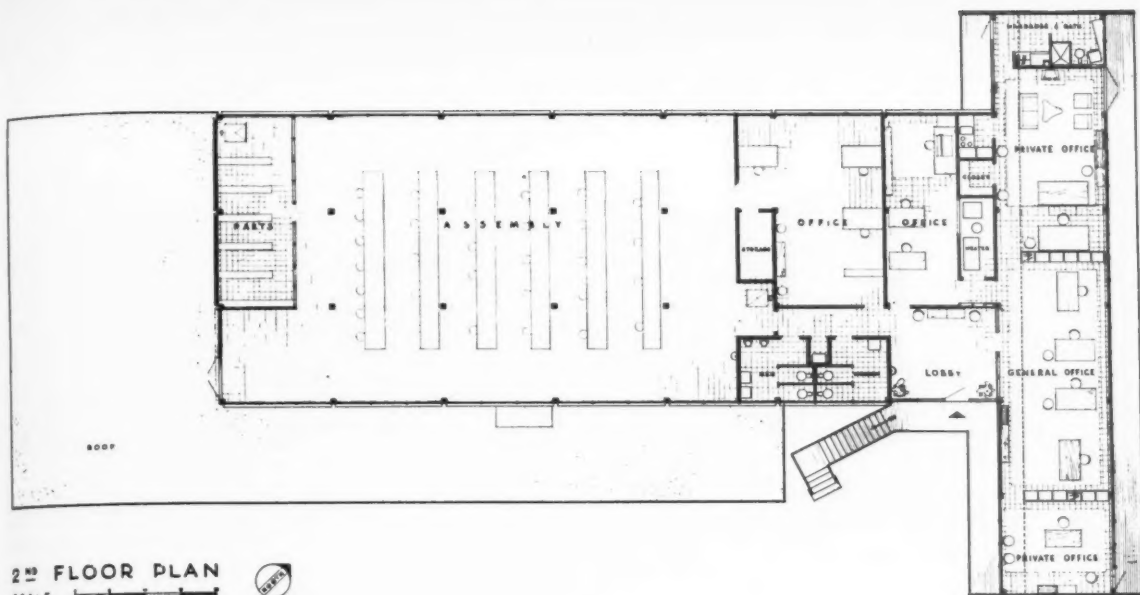
By FRANCIS JOSEPH McCARTHY, AIA, San Francisco

SOME of the prime considerations involved in planning the lighting scheme for an industrial plant are:

1. To supply adequate and properly directed illumination for each work bench and piece of machinery. Obviously this requires an intimate knowledge of the work program and the equipment to be used.
2. To supply adequate general illumination for general movement, overall supervision, and to eliminate any hazardous "dark spots."
3. To control natural light sources and insure reasonably consistent illumination during the work period. It is conceivable that the artificial light might have to be amplified for a night

shift if natural light is the "general" light source during a day shift.

4. To take into consideration the light-reflecting qualities of certain color values and tints in order to utilize the full value of the light—both artificial and natural supplied.
5. To consider surface qualities, matt finishes as against enamelled finishes which create irritating and attention-consuming glare.
6. To provide flexibility, anticipating possible rearrangement of the manufacturing process.
7. To determine the light intensity (foot candles) desirable for the different work functions planned.
8. To plan for eye relief to relieve the tension of a flat uniform light.



ABOVE—Floor plans for the two-story building. For electronic development firm occupying the first floor, note how communication difficulties have been alleviated. Offices directly adjoin large laboratory and drafting room, which in turn communicate directly with machine shop, stockroom, etc. Long narrow plant permits daylight illumination from high windows placed along both sides of both building levels.

RIGHT—For merchandising firm occupying wing of second floor, reception and entertainment of visitors was an important consideration. Attractive architecture at entrance provides the first favorable impression.



supplied by regularly spaced recessed ceiling lighting.

The same general color schemes are used in the office areas as were used in the work area.

Arranged for Assembly Efficiency

Sierra Electronic Manufacturing Co. is a newly organized manufacturing company, formed to handle the production of electronic equipment developed by Sierra Electronic Corp., or other companies requiring the availability of manufacturing capacity on a custom basis.

Since assembly is the chief problem, this group occupies the southwest end of the main wing on the second floor. Aside from a small stockroom, the area is entirely devoted to parallel rows of assembly benches, flooded with daylight and cold cathode light for assembly efficiency and low worker fatigue.

Designed for Visitor Reception

Electronic Engineering Associates, Ltd., is a merchandising and application-engineering firm concerned with the exclusive distribution of certain

Sierra products and other equipment for use throughout industry. In addition to maintaining close liaison with both Sierra companies, its problems are largely those of contact with users and prospective users of the products being merchandised.

This group occupies the Northeast wing on the second floor with sales and administrative offices, and has a small drafting room and application laboratory in the second floor center. These offices, somewhat more elaborate than the workaday offices of the development and production companies, are designed for the comfortable reception and entertainment of visitors—including a kitchenette, shower, and even sleeping facilities.

Built for Easy Expansion

This building was envisioned as the basic unit of a potential group of several, and the plot was chosen to accommodate considerable expansion. Such expansion is most likely to affect the production organization. Accordingly, this unit was planned to provide all the basic facilities required by the development and merchandising

groups for the foreseeable future.

Additional buildings will serve as manufacturing and assembly units, although this building is assembled from prefabricated concrete-block wall panels which permit easy remodeling and expansion.

Factors in Site Selection

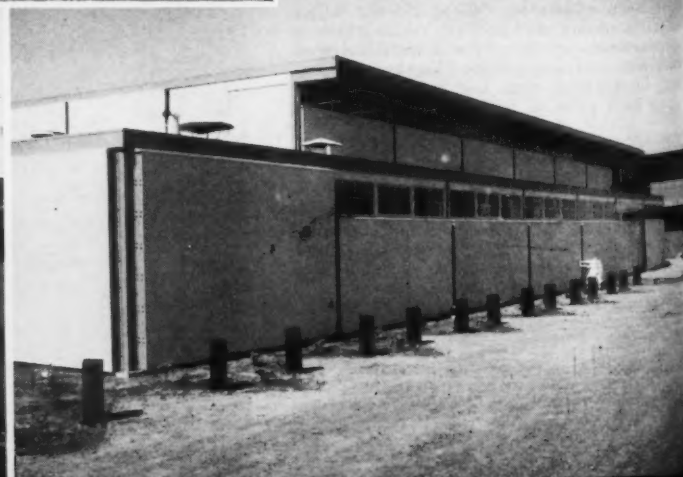
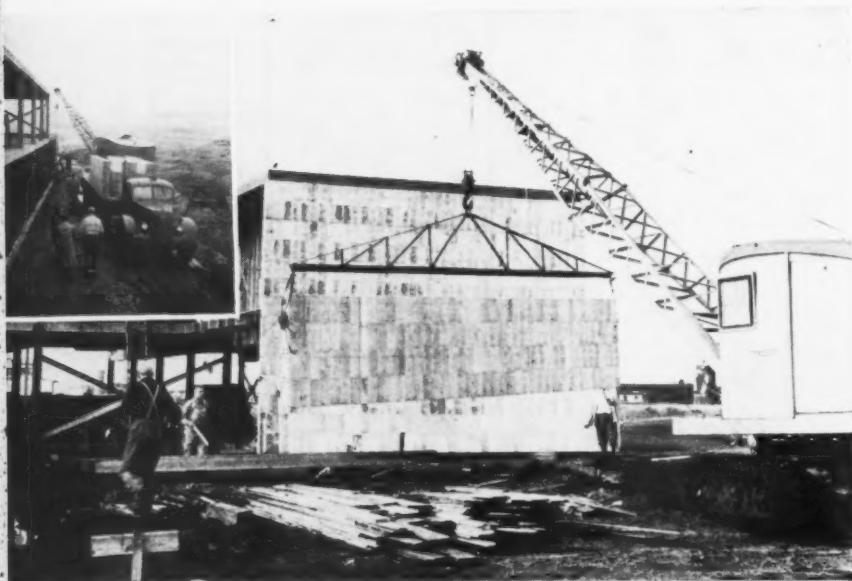
San Carlos was selected as the site of the Sierra Building for several reasons. The area centering around San Carlos has grown into a nationally-recognized center of electronic research and development.

Not far from here Lee DeForest did his early work on the electron tube, and since that time such well-known concerns as Varian Associates, Lenkurt Electric Co., Hewlett-Packard Co., Dalmo Victor Co., Eitel-McCullough, Inc., and others arrived who have earned recognition for their accomplishments in the field of electronics. As a result of this activity, experienced technicians and electronic assembly workers are in good supply here. In addition, San Carlos is central to the many companies who are expected to make use of the company's manufacturing services in the future.

San Carlos has been given credit by the Smithsonian Institute for a climate equal to that of Madagascar and the Canary Islands, and better than anywhere else in the world. This is, of course, a powerful factor in the ability of a company to attract and retain desirable personnel.

The particular site in San Carlos

Exterior wall panels of 6-in. thick Streetcrete concrete block, were erected entirely during driving December rains. Panels were assembled at supplier's plant and trucked to the site (inset at upper left). A crane lifted panels from the trucks and spotted them between wood columns, where they were bolted securely. A total of 34,000 sq. ft. of panels was placed in two days. Below, attractive exterior after "Cemelith" finishing.



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ABOVE—Machine shop area on ground floor of the new building. This facility, part of the electronic development company's operations, is in effect a large-scale model shop.

TOP RIGHT—View of part of assembly operations with spray-paint booths and paint-baking ovens in background.

RIGHT—Assembly area on the second floor. Fluorescent lights are strategically located over each work bench.

was chosen for its area and its accessibility over paved streets from El Camino Real—the town's main street, and Bayshore Highway—the freeway leading south from San Francisco.

A railway spur is available on either side of the property, and while electronic production usually involves relatively light products—both as raw materials and as finished goods—trackage is potentially useful for larger products which may eventuate as well as for delivery of heavy production equipment.

Developmental laboratory connects directly with plant area as well as drafting room and offices.

BUILDING FEATURES . . .

ROOF

Wood frame, built-up tar and gravel over wood sheathing. Six lb. dry, four layers of 15-lb. asphalt saturated felt, mopped solid, and 300 lbs. pea gravel per square.

FRAME CONSTRUCTION

Post and lintel, with 8 x 8 wood posts throughout. 8 x 14 lintels on the first floor, 8 x 10's on the second floor.

FLOORS

Shop areas have 6 in. concrete over compacted rock base, reinforced with wire mesh. Offices and lab on the first floor have a 4-in. concrete floor over a similar base. Second floor office is over wood joists and diagonal sub-floor, covered with plywood and Armstrong asphalt tile.

CEILING

Acoustic tile by Simpson Co. is used in office areas; fibre insulation board

Drafting room, located on the northeast side of the building, has particularly high and uniform illumination.



Office areas on both floors have large windows to the east as natural light source.

by Simpson is employed in shop areas.

PARTITIONS

Interior partitions are wood stud with 1/2-in. plywood, and insulation board above plywood wainscoting, on the first floor. Partitions on the second floor are plywood full height, also by Simpson, and all interior partitions were pre-finished.

WINDOWS

All industrial steel sash, projected and pivoted, manufactured by Soule Steel Co. Incidentally, the "penalty" for using special sizes throughout the building, rather than regular stock sash, amounted to only \$60.00 total.

GLASS

All Libby-Owens-Ford double strength, with the exception of Mississippi Glass Co.'s Factrolite, obscure panels in the lab and design areas.

WALL PANELS

Exterior wall panels are of 6 in. thick Strestcrete concrete block. These panels were assembled at the manufacturing plant of Basalt Rock, Napa, Calif., and trucked to the job. There they were lifted off the trucks and spotted by crane, between wood columns, then bolted securely. As a matter of record, 34,000 sq. ft. of these panels were placed in two days, during

the height of December driving rains. "Cemelith," by Super Concrete Emulsions, Ltd., Los Angeles, was used on all Strestcrete panels.

ELECTRICAL SYSTEM

This plant is supplied by 120-208 volt three-phase 4-wire system. Square D controls. A 400-amp. main supplies the downstairs plant. A 200-amp. main goes to Sierra Mfg. Co., and a 100-amp. main supplies Electronics Engineering Associates.

DOORS

All flush doors, stock sizes and manufacture.

HARDWARE

Schlage lock sets.

PLUMBING AND PIPE

Plumbing fixtures are Standard Sanitary and Koehler. Hot water pipe is copper; cold water pipe is steel.

HEATING

Six Clipper furnaces. These forced warm air units are gas fired, manufactured by Henderson Furnace & Mfg. Co., Sebastopol, Calif. Shop areas are heated through plenums; office areas, through duct and register.

AIR CONDITIONING

Air conditioning (heating and cool-

ing system, but no humidity control) is provided only in the executive office of Electronic Engineering Associates, by McIntyre Engineering Co.'s Unit Air Conditioner.

INSULATION

4 in. rock wool batts in second floor offices ceiling.

PARKING FACILITIES

About 75 automobiles can be accommodated in the present parking area, which is paved with 2 in. armor coat over 8 in. rock base.

GROUNDS

Landscaped to develop beauty of the building as well as the property. One of the considerations in designing this plant was that the plant not only furnished a community payroll; it also had a civic obligation to meet by way of not becoming an industrial eyesore. Hence, the grounds are covered, not with lawn (that would require mowing) but rather with *hedera helix variegata*. A large olive tree will grace the plant box in the front patio, and eucalyptus and poplar trees will beautify the immediate landscape. Small shrubbery will be mostly *pittosporum*.

Behind the Scenes . . .

ARCHITECT—Francis Joseph McCarthy, AIA.

STRUCTURAL ENGINEER—A. V. Saph, Jr.

MECHANICAL ENGINEER—G. M. Simonson.

LANDSCAPE ARCHITECT—Douglas Baylis.

CONTRACTOR — Baker Construction Co., Belmont.

SUB CONTRACTORS—

Plumbing . . . Doppee Plumbing Co., Redwood City.

Electrical . . . Peninsula Electric, Belmont.

Heating and Sheet Metal . . . San Carlos Sheet Metal Co., San Carlos.

Strestcrete . . . Basalt Rock Co., Napa.

Glass . . . A-I Glass Co., Redwood City.

Paving . . . C. F. Archibald, Redwood City.

Millwork . . . Ball Supply Co., San Carlos, and Sequoia Mill, Belmont.

Asphalt Tile . . . Belmont Floor Covering, Belmont.

Roofing . . . Dougherty Roofing Co., Burlingame.

Finish Hardware . . . E. M. Hundley Co., San Francisco.

Sash . . . San Carlos Feed & Fuel Co., San Carlos.

Lumber . . . O'Neill Lumber Co., Redwood City.



General Electric's San Francisco service shop for induction motors. Most motor troubles cured here could have been prevented in use.

DOCTORING ELECTRIC MOTORS

Follow these basic rules for diagnosing and eliminating induction motor troubles and you'll keep shutdown time at a minimum

ELECTRIC MOTORS are remarkably efficient and trouble-free pieces of plant equipment. They demand very little attention and care, yet produce work and value far outweighing their cost and care.

However, electric motors are not infallible. They do develop troubles, on occasion. Drawing on the old proverb, "An ounce of prevention is worth a pound of cure," a few cents' worth of preventive maintenance is worth many dollars' worth of repair or replacement. In addition to the obvious cost of replacement is the loss of production time and its consequent loss of revenue.

Statistics reveal that improper care, or lack of proper maintenance, is the factor responsible for most motor ills. A little consideration of the maintenance problem will pay off big in low production costs as well as in minimum shut-down time.

Here are five simple rules which, if

followed, should add to your motor life:

1. *Keep it clean.*
2. *Keep it properly lubricated on a regular schedule.*



By ROY C. HENNING

Western Industry's
Consulting Editor,
Electricity and
Electronics

3. *Periodically check the load the motor is carrying.*
4. *Periodically check the current drawn by the motor.*
5. *Keep records of troubles and cures as they occur, as a means of diagnosing recurrent cases and*

easily finding the causes. A card file is excellent for this purpose.

Even with a minimum of trouble assured by proper preventive maintenance, troubles may still occur. Here, in order of frequency of occurrence, are listed four basic causes of electric motor trouble:

1. Load applied to the motor is too much.
2. Current applied to the motor is not right.
3. Conditions that exist around the motor are not conducive to efficient operation.
4. Faults in the motor mechanism prevent proper operation.

These basic causes may not be readily apparent, but their symptoms will be manifested generally in one of four ways:

1. Motor will not start.
2. Motor will run hot.
3. Motor will run noisy.
4. Motor will not run right.

When any of these familiar symptoms crop up, some sort of remedial action must be undertaken immediately. Following is a check list of things to do by way of correcting these



Pictured above are two views of a 1/2-hp. open-type motor that was not properly cleaned. Excessive oil and lint in motor, combined with paint drippings that sealed ventilating holes, caused overheating with resultant burnout. Motor was scrapped. Installation of totally-enclosed motor or protective devices could have kept it clean.

faults in your motors. If any other troubles are evident, or if these prescribed remedies do not cure the patient, it is well to call in a "motor doctor" from the manufacturer or from a reliable electric motor repair firm.

1. Why It Won't Start

1a. *First and easiest check is to determine that there is voltage present at the motor terminals.* A light bulb or voltmeter will tell if there is voltage and if it is of the rated value for the motor in question. Voltage should be within 10% of voltage shown on name plate. In making this test on a single-phase motor, there are just two lines to measure across. With a two-phase motor the voltmeter or test light should be applied to lines 1 and 2, 2 and 3, and 1 and 3. If the voltages are not approximately the same, as indicated by the voltmeter or the relative brilliancy of the lamp, there is an open in the line.

1b. *A blown fuse of an open overload protector of the magnetic or thermal type may be the cause of no voltage.*

An indication on the voltmeter or test lamp proves that the fuse is blown. If blown, replace with another of the correct rating. Fuses should be at least 125% of full rated current.

In the case of the magnetic overload protector a resetting of this relay will restore the circuit again. With the thermal breaker it will be necessary to allow it to cool for a reasonable length of time before reclosing.

1c. *Motor not connected properly. Incorrect voltage or frequency of source of supply.*

Be sure to follow the connection diagram that is usually supplied with the motor. Should this be lost, consult a competent electrician for the proper connections. Value of the line voltage is easily checked with a voltmeter. Frequency of the power source can best be determined by consulting your power supplier, the power company.

2. Why Motor Runs Hot

A good rule of thumb is if you can keep your hand on the motor, it is probably operating at a safe temperature. If you can fry an egg on a motor, it is safe to assume that it is operating at too high a temperature. However, if the "feel" test indicates the temperature to be too high, make an accurate measurement with a thermometer held against the motor laminations. If the temperature raise is greater than indi-

THIS ARTICLE is based on information from the author's knowledge and experience, plus information supplied by the following fractional horsepower electric motor manufacturers: General Electric Co., Schenectady, N. Y.; U. S. Electrical Motors, Inc., Los Angeles; Wagner Electric Corp., St. Louis, Mo.; Westinghouse Electric & Manufacturing Co., Lima, Ohio.

cated on the name plate, the trouble will probably lie in one of the following possibilities. Since practically all of the present day small motors have their coils wound of wire that is insulated with the new synthetic enamels, it can be considered that the insulation is about equal on all makes of motors. The new enamels are tougher and can stand abrasion and bending better, but



Rotor taken from 1/4-hp. motor that was overloaded. Rotor locked and insulation burned until motor was short-circuited.

they fall within the National Electric Manufacturers Association classification of Class A insulation. Class A insulation can be used up to temperatures of 90° C.

2a. *Bearing trouble.* If shaft does not revolve freely, lubricate bearings. Bearings may be clogged with dirt or wrong lubricant may be used. If bearings continue to run hot, remove rotor and repair bearings.

2b *Short-circuited coils.* If motor draws excessive no-load current, providing the line voltage is correct, it is fairly good indication of shorted coils in the stator. This condition will also indicate its presence by a louder than normal "groaning" (magnetic noise). Remove shorted coils and replace.

2c. *Grounded winding or switch.* Abnormal magnetic noise, in addition to excessive heating, will indicate this condition. A voltmeter or lamp will

show a voltage between the motor frame and ground when motor is isolated from ground. Remove coils and repair insulation. To guard against insulation breakdowns be sure motor has adequate ventilation. Dirt, moisture, and corrosive fumes will shorten insulation life and cause its failure.

2d. Incorrect voltage. Either too low or too high a voltage will cause motor to overheat. The voltage should be measured at motor terminals with motor operating under full load conditions.

2e. Rotor rubbing on stator. Bearings could be badly worn, causing this condition. Remove bearings and replace. Another possible offender is the presence of some foreign matter in the air gap between rotor and stator. Disassemble motor and clean thoroughly.

2f. Motor overload. Take a reading with an ammeter, of the current drawn by the motor. If the value indicated exceeds that shown on the name plate of the motor (all other conditions being correct), the mechanical load applied to the shaft could be too great.

3. Why It's Noisy

Noise and excessive vibration are often companions, although either can be present independently. Incorrect alignment of motor with load, or an unbalanced load can be possible causes of motor vibration. In most cases the causes of vibration will be found to be external to the motor. If vibration is present, its elimination will probably eliminate the noise also. Other reasons for noise are as follows:

3a. Worn bearings. Bearings must be removed and replaced.

3b. Dirty bearings. Bearings should be removed and the old dirty grease flushed out with clean solvent. This cleaning operation will also remove any foreign particles that could cause a rough and noisy bearing.

3c. Dirt in air gap. This scratching noise is likely to be intermittent and irregular. Disassemble the motor and blow dirt out of air gap.

3d. Air gap not uniform. A bent shaft or an unbalanced rotor would cause this condition. Straighten the shaft or replace the rotor.

3e. Rough commutator, or brushes not seating well. Though this noise would occur only during the starting period, it should be eliminated by smoothing the commutator and brushes with fine sandpaper. (Don't use emery.)

3f. Excessive end play. End play should be reduced to the smallest amount possible. Make sure no stick-

ing occurs. To reduce end play, use washers supplied by the maker of motor for that purpose.

3g. Amplified motor noises. When this kind of trouble is encountered, it may be that the inherent noise generated in the motor is only that normally created, but that through a resonant mounting it has become greatly amplified. If this condition is suspected, place the motor on a solid firm floor and see whether noise persists. If noise disappears, the mounting is at fault. Rubber mounts will usually cure this form of noise.

3h. Motor not securely mounted on its base. If motor has its mounting feet as an integral part of a cast frame, take care to avoid setting up strains when fastening down motor to base. When steel bases are used on motor, they may be bolted down without fear of cracking the mount; but do not impart too much strain, even so.

4. Why It Won't Run Right

4a. Runs too slowly. Line voltage below rated value. Voltage at motor terminals should be within plus or minus 10% of voltage on name plate.

4b. Runs too fast. Line voltage above rated value. (See above.)

4c. Motor starts or stops. Power line failure of loose connections in windings.

Reduced speed may be due to too great a load on the motor. The driven load should be checked to see whether it is normal. The motor speed should be checked to see whether it is normal.

4d. Wrong motor for the job. Mechanical loads that require a high starting torque should be equipped with such a type of motor. For any special type of motor application consult the motor manufacturer. They all maintain field engineering services and are very willing to offer all assistance possible.

4e. Brushes do not release. Brushes should leave contact with the commutator within 5 seconds of starting of motor. The primary reason for the brushes refusing to throw off is lack of motor speed. In addition to reasons already stated for insufficient motor speed, dirty commutators can be a source of trouble. A sticking governor mechanism or brushes sticking, or brushes worn too short for good contact to commutator are also causes of bad performance.

Now with your motor started, running cool, quietly, operating at the right speed and otherwise normally, let us keep it running that way. Proper maintenance will do this. It has been observed by motor maintenance shops that at least 75% of motor failures are bearing troubles. A lubrication schedule will eliminate this pitfall.

All these troubles, as outlined, are the ones that service shops and the manufacturers have found to be the most common ones happening to induction type electrical motors. By careful observation most of these ills can be localized and eliminated by the average shop man whose specialty is not electrical equipment. Who knows, you may become a motor specialist if you work on enough motors.

Induction motor field coil receives a new winding at G.E.'s San Francisco service shop.



"RUBBERSMITHING" wins out over electrolytic corrosion

ELECTROLYTIC CORROSION is an industrial bugaboo, wherever it occurs. It is hard to locate, harder to eliminate. Here is a sample of the type of problem that drops in on me unannounced, this one having to do with corrosion of a metal pipeline that runs along the ground, in the air, and underneath the sea for a distance of half a mile. It started to corrode, but we fixed it. Here is the story:

The Standard Pipe Line Company has at its Estero Terminal, located on the Coast a few miles north of Morro Bay, California, facilities for loading sea-going tankers with crude received by pipeline from the San Joaquin Valley.

Crude to the tankers is fed from tanks situated on hilltops at an average elevation of about 650 ft. above sea level. The tankers, which cannot come closer to shore than approximately half a mile, are each loaded through one of two submarine loading lines located on the ocean floor. Each loading line is parallel with a circulating line through which salt water ballast is pumped from the tanker to shore tanks, prior to loading. During loading operations the circulating line is used along with the loading line for transporting the crude aboard the tanker.

Four Lines Needed Protection

To prevent the sea water from corroding the external surface of these submarine lines, cathodic protection has been applied to all four of the lines. Each of the lines is insulated at the shore end to concentrate protection on the underwater portions where it is most needed. The lines were insulated with standard insulating flanges, consisting of two Series 30 flanges with a micarta ring gasket between the faces, and micarta sleeves and washers around the stud bolts.

Normally this arrangement has proven satisfactory for insulating crude lines, but for insulating the two circulating lines, which sometimes contain salt water, another problem arises. With cathodic protection applied to the sea end of these lines, a difference in potential of one to two volts exists across the insulating flange, the shore end being positive to the sea end. This would cause no apparent trouble except for the fact that salt water was often used in these lines. With the existing potential difference and as good an electrolyte as salt water, cor-

rosion was bound to occur; and an inspection revealed that it had.

The shore end of the line to a point seven inches from the face of the flange showed pitting. The deepest pitting occurred near the insulating gasket. The problem at hand, then, was to create some type of insulating coupling that would not be short-circuited by the salt water.

It was decided to make a flanged pipe spool approximately two feet long and line it with rubber bonded and vulcanized to the pipe and around to the face of the flanges.

I was called in to see if I could do

the insulating job. After getting the details of what needed to go into it in the way of materials, I decided I could either do it with my present equipment or rig up for it.

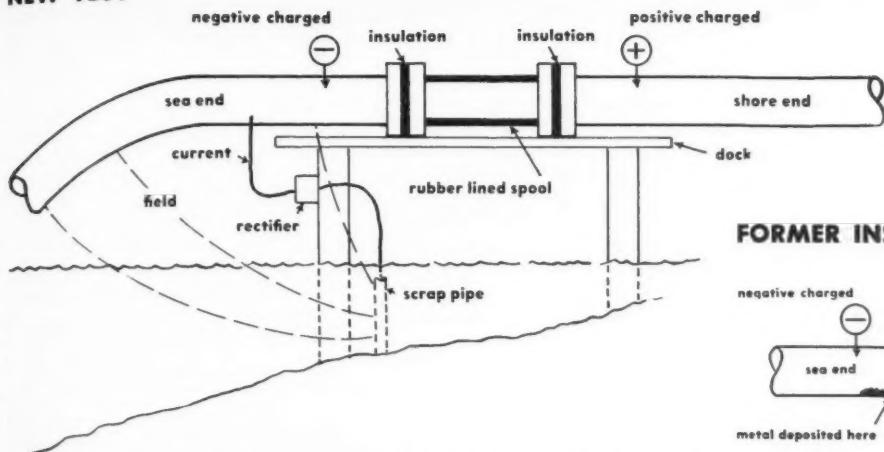
I wanted to be pretty sure that the selection of the materials to be used would meet the requirements of the job; so I took up the selection of the stocks with the chief chemist of Los Angeles Standard Rubber Company, Fred Woerner. I had just finished a 15-week course in basic rubber technology under Woerner and Ray Stringfield.

Both Woerner and I figured we should use a sulfurless cured Buna N long-curing stock and one that would not continue to cure after the initial set was made. Then use Typly BN as the metal bonding cement (note I'd

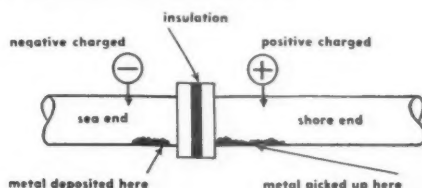
R. J. TILLOTSON, Rubbersmith, makes everything to order, whether it be a stomach plug or a canal gate splice. His successful bout with electrolytic corrosion, described on these pages, is only one interesting chapter of a career that began at age 58.



NEW TEST



FORMER INSTALLATION



Problem facing the rubbersmith was to create a flanged pipe spool lined with rubber that would not be short-circuited by salt water.

use my own cement compounds now and speed up the curing time).

The set of conditions to be met in service are rather a severe job for a piece of rubber goods. They are about as follows:

1. Must stand up under all types of fuel pumped through the lines from hot heavy crude oil to high test high octane gasoline. The rubber will be in direct contact with the fuel.
2. Must not absorb water.
3. Must be an electric insulator in compressed water.
4. Must not be affected by salt.
5. Must not age to a point of brittleness and cracking over a long period of time.
6. Must adhere to the metal.

When the spools arrived at the plant, I found that the flanges on them were of the heavy duty type, being 2 inches and 2½ inches thick on the eight inch pipe and the 12 inch pipe respectively. I had figured on standard ¼ inch thick flanges and could have put them in my bake oven. But here were two unlooked for new problems to contend with: getting those heavy flanges up to curing temperature and holding it there for the long curing period, and also the handling of the processing. They were so heavy that each move of them had to be done with a chain block, unless on the floor where they could be rolled.

The joist of the ceiling was reinforced with angle iron to swing the load and a steel rack was made to prepare, cure, and build on.

Hands Off!

One part of the rubber-to-metal processing is exacting. After the metal is thoroughly cleaned by sandblast, it must not be touched with the hands and the bonding coat of cement must be applied before any oxidation starts

on the surface. With steel, an hour's time will not hurt much except in a damp climate; but with aluminum and brass, just do not stop to play around. Get it on there and be safe.

These two spools were hauled three miles to a commercial sand blaster, sealed at the ends with a piece of plywood after blasting, and returned to the plant. The first coat of bonding cement was sprayed on, allowed to dry about 20 minutes, and another bonding coat given just to be sure of no missed spots. It was then given a "cousin" coat, made of 50% bonding stock and 50% material put into solution with methylethylketone. A fourth coat was given as tack coat, made of 100% material put into solution.

These last two coats had to be put on with a brush. They were too stringy to spray. The cemented spools were then allowed to dry over night. In bonding rubber to metal, especially in open steam with no mechanical pressure, the thorough drying out of the cement solvents is essential. If any solvent moisture whatsoever is left under the applied rubber, it will form gas and make a bubble.

Tack by Instinct

In moulded goods the drying out condition is not quite so critical. Mechanical pressure will force the solvent gas through the rubber if there is not too much of it. But in order to get sure bonds, the longer drying period is usually adhered to—at least in my shop.

The next procedure was to lay in the rubber. It had been sheeted off the mill at 3/32" thick but not calendered. It needed cutting in strips and washing with solvent to produce tack. The solvent was allowed to dry off and the tackified surface applied before a

surface glaze was put on by oxygen in the air. One of the skills of a rubber worker is to know instinctively this proper tack condition by feel. And so as not to get his rubber contaminated with any foreign substance, such as perspiration oil, etc., he must keep his hands cleaned with solvents.

I remember a colored man who was a good retreader, but he had trouble with treads coming loose in spots in the summer time. One day Bill asked me what to do about it. I asked him if he sweated much when he was building up. He said he did. "Well, Bill, you just keep the solvent rag handy and every time you tackify the ends of your camelback, you first wipe the perspiration off your hands and the treads will stay put." Bill did. They did.

Snugging the Joint

Rubber-to-metal work is more exacting than treading tires. I've done plenty of both.

The inside of these spools was laid up in two layers with the strips butting at the edges, the laps of the second layer being spaced in the middle of the first layer. Care was taken that the joint was sufficiently snug for them to bond together when the stitcher (a narrow roller) was applied.

Buna N is hard to work in this respect; it is not nearly so tacky nor so pliable in the raw gum stage as natural or GRS rubbers. These joints were made tight by cutting the stock 1/16" wider than actual measurements, applying the edges first and forcing the rest down by compression.

I had the largest spool nearly built in the afternoon of the second day of preparation, when Mr. Roati, of the Company's engineering department, came in and told me they had had a

washout in the 8-inch line, and would like to put the spool in while the line was down. Well, I switched spools, got the 8-inch built by 6:30, went home for a bite to eat, came back and started to rig for cure. By 1:30 a. m. she was ready and air tested. I left the air on, and it was up to pressure the next morning. The steam was fired up and the oven lit up. By 9 p. m. the process was completed.

This 8-inch spool was put through in such a hurry that I did not rig for all the data I desired for future use. I just took flange temperatures and condensed steam temperatures and charted out the cure to be sure it was cooked.

The following morning I broke all the rules of a lazy man and got down on the job early. I had the rigging all torn out and the overflow dressed out and the job ready to go when they called to see how it was coming along. That is just one of those work-against-the-clock jobs that pops up about every so often.

My policy has always been, "If they are in a jam, step on it; get it done." Do not stop for fancy methods. Go unorthodox. My aunt told me when I was a boy, "Never leave your hammer hanging in the air when the whistle blows. It might drop on you; then you are out."

The ten-inch spool I had more time on; so I rigged the cure on it to get all the data possible on heating up the heavy pieces of metal. A bleeder was put on the return line to start circulation if it stopped. A centigrade thermocouple was attached at the bend of the flange at the thickest point in the metal. A well was put in the airblast outlet for temperature readings taken on the steam gauge, and readings were taken on the flange by inserting a thermometer in a hole drilled in a bolt, shimmed tight, in a flange bolt hole, which transferred correct temperature readings. These readings were all charted. We know now how long it takes to heat up that much metal by use of steam and hot air.

This job did not come out so well, and one end needed repair where the flow of rubber did not knit. Another difficulty often encountered with Buna N: it does not always do as you think it should.

Applying the Heat Cure

The repair job was cured differently. A special repair mould was made that would put on mechanical pressure by screwing up on a turnbuckle. A bank of twelve infra-red ray lamps was placed around the flange. They were 375-watt industrial type lamps, using 4,500 watts in all. An automatic

thermostatic control was ordered for this job but did not arrive in time; so the controlling of temperature was done manually at approximate five-minute intervals.

The charts were kept on this operation also. There was a surprising difference in the speed of the heating up process. This speed of heat penetration of heavy metal pieces by infra-red ray was so pronounced that I have adapted it to a production job and have cut the time of cure on a heavy metal-to-rubber job from two hours and forty minutes to one hour and twenty minutes.

These pipeline spools have both been installed, and so far are O. K. However, several years of service will be required to find out if the problem is completely licked.

This is not the finish of this particular application problem. Drawing up of an aluminum forming tool has

been made for shaping the ends to utilize infra-red heat instead of steam and hot air.

The Best . . . and Quickest

However, any method of doing a job in this shop is not a permanent method. It may be the best and quickest at the time. But the experience gained is merely the basis for further hunt to do the job easier, cheaper, maybe better, but not to slight any of the conditions of the specific service.

By the time another spool is needed, I may have found a commercial polyester, a polysulfide or a polyvinylchloride that will do this job just as well and at less cost and labor. Or I may develop a material myself. I want to be able to go into the field and put the stuff on with a trowel. But whatever the material is, it must be able to meet all of the conditions it is subjected to—not just a part of them.

HELICOPTERS SHAKE DOWN FIGS

NOW they are harvesting figs with helicopters, latest production method in that industry. The flying windmills have experimented with harvesting of other fruit such as prunes, and various nuts, but with not-too-good success.

Success in the fig orchards is due, in great part, to the physical structure of fig trees. Fig leaves are large, and



Downwash from helicopter's rotors gives the trees a good shaking to cause about 90% of figs to fall to the ground. Cost of the method is slightly more than hand shaking but speed of the operation (one acre per minute) more than makes up the difference.

they effectively catch the downwash of wind from the helicopter's rotors. Fig tree limbs are relatively flexible, thereby helping the shaking process.

A bit of experimenting on the part of Western Helicopter Operations, Inc., Fresno, California, during the latter part of last September developed these conclusions:

1. Optimum results were obtained when the helicopters flew as close to the tree tops as possible;

2. Optimum flying speed was approximately 18 miles per hour.

This allowed the huge downwash (2,000,000 cu. ft. per min.) to give the trees a good shaking. Approximately 90% of the ripe figs fell to the ground. In addition, downwash scattered the leaves from under the trees, making harvesting more effective.

Charge for this operation is standardized at \$1.65 per acre, slightly above the cost of shaking the trees by hand. However, this method of aerial shaking offers growers these four advantages over hand shaking:

1. Speed (approximately one acre per min. is covered).

2. Leaves are automatically scattered.

3. Elimination of damage to the trees caused by hand shaking (hitting the trees with sticks or mallets).

4. Figs in the tops of the trees were shaken loose. Many times these figs were missed by the hand shaking operation.

Best endorsement of the success of this operation is the present sentiment of fig growers. Some growers have indicated that they would desire four or five shakings, starting this harvesting season.

Last fall, over 4,000 acres of figs were harvested in the Fresno and Merced areas in about three weeks, at the cost of only \$1.65 per acre. With continued success of this type, fig shaking by helicopter may become the predominant method of harvesting dried figs.

WESTERN PROCESSES AND PRODUCTS

in
Today's **V**iew



DEATH TO SUBS is what this P2V-5, newest version of U. S. Navy's prime anti-submarine airplane, deals out. Lockheed Aircraft produces these planes. First deliveries in April.



CONTRAST OF 40 YEARS aviation history. Midget plane shown is Curtiss-type biplane, 1912 model, single pusher engine. Giant is B-36-D Air Force bomber, with 42,000 hp. pushing.



JET POWERED HELICOPTER is now a reality. Shown contrasted with Navy Constitution is the little Hiller Hornet, latest product in helicopter research, two-place light-weight craft.



STANDING STILL THREE FEET UP—is this prototype model MC-4, completely new tandem rotor two-place helicopter about to be produced for the Navy by McCullough Motors Corp.

TIPS FOR AVOIDING COSTLY ACCIDENTS

By
WILLIAM E. OSBORN
Safety Engineer
California Consumers
Corporation
Los Angeles



1. Accidents Go Up With Overtime

DURING a discussion with our general manager relative to the new low attained for per cent of overtime as compared with total hours worked for the month, our attention became focused on the new low in number of injuries reported for the same period.

Here, apparently, was a correlation. Then the question naturally arose: Just how good is it?

Actually, the basic theory behind the similarity of conduct between the figures on number of injuries in a plant and amount of overtime has been explored in considerable detail by students of industrial fatigue. So it could be reasonably concluded that our correlation had possibilities.

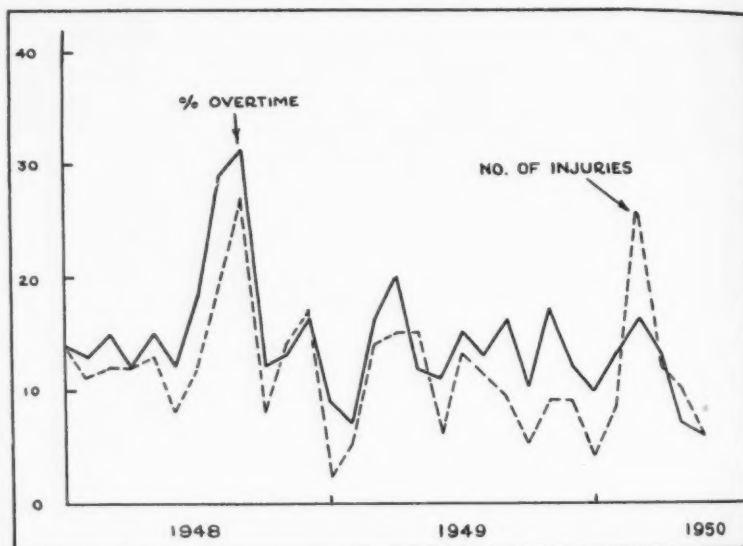
When the dust was brushed from the statistical methods textbook, and values inserted into the XYZ's of the formulae, a remarkably close correlation was discovered.

For the two and one-half year period ending June 30, 1950, the coefficient of correlation between number of injuries and percent of overtime taken by months was found to be plus

.75. Considering the number of months used in the analysis, such a coefficient is evidence of a decided amount of association between the two series.

We are constantly looking for methods to reduce needless overtime hours in our operations, but many times it

is difficult to justify this effort except for reasons of economy. It is a certainty that any future meetings where the need for fewer overtime hours is discussed, we will also incorporate the relationship between overtime and injuries.



2. Workers Safe—If They Know How

We believe that accident prevention comes about primarily by first facing the problem, and then organizing a definite plan to prevent accidents. Highly instrumental in this latter endeavor is the use of visual aids. Employees can see with their own eyes, and understand and figure out for themselves what could happen to them.

For example, we made good use of the National Association of Refrigerated Warehouses' copy of the safety-graph "Industrial Power Trucks." We obtained it for a ten-day trial. It was directed toward safety education of power truck operators, and was of particular interest to the newer operators.

This safetygraph was employed as per instructions incorporated in the packaged unit. They are well-detailed and easy to follow, cutting down preparation time of the user to a minimum. It was shown and discussed in safety committee meetings at our several plants, with these observations paramount:

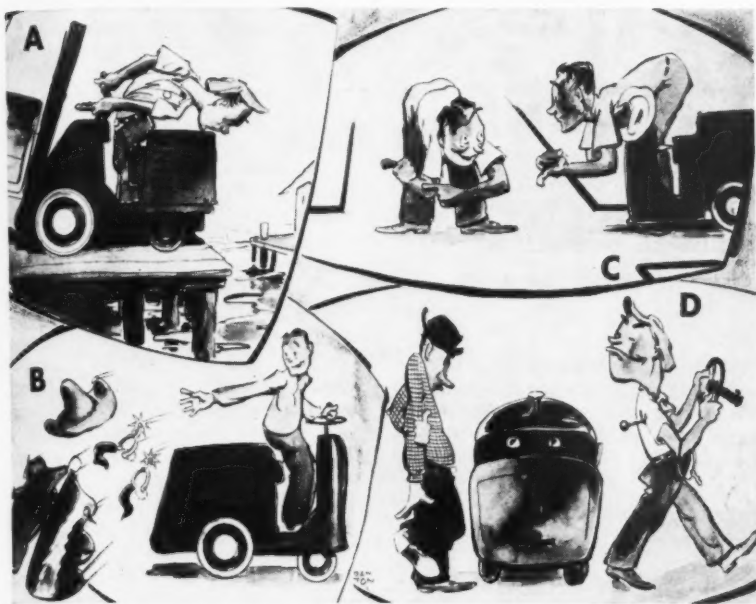
1. Illustrations and material have appeal and universal interest for material handling personnel.
2. Method of presentation is well accepted.
3. Similar setups on electric transporters would interest more people in warehouse operations.

4. The majority of injuries, as shown by national statistics, are sustained from lifting. The suggestion was made to send two safetygraphs as a team—one on "How to Lift" and the other covering safe operation of electric transporters.

Actual results of using the safety-graph are difficult to measure. As in all safety education, the good is shown by the number of injuries that do not occur. Such a measure is only relative, and much as we would like, cannot be directed toward any one particular factor.

However, the safetygraph is another bright step in our over-all program to stop accidents before they happen. It can rightfully take its share of the contribution toward lowering our accident frequency.

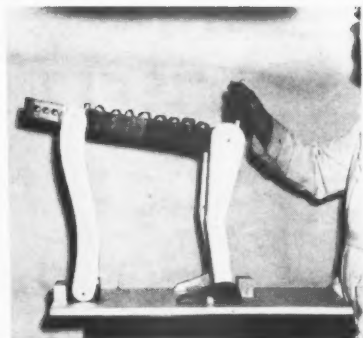
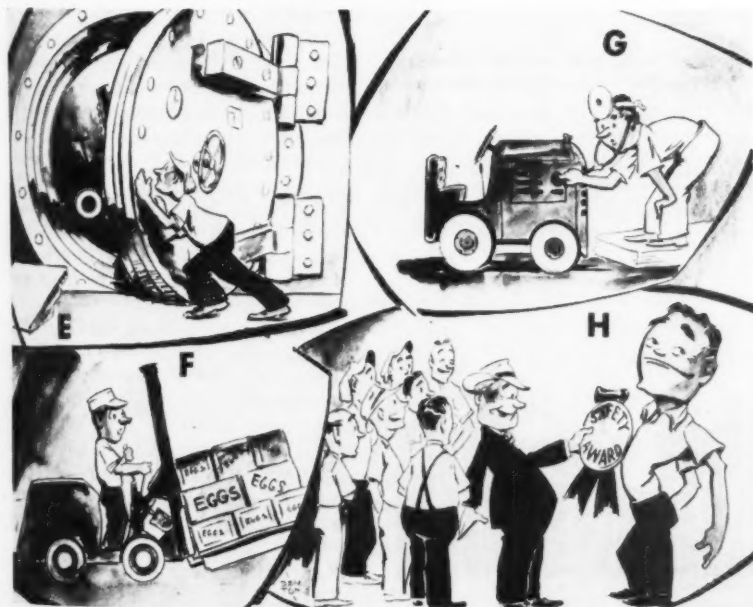
3. Visual Aids to Show Them How



SAFETYGRAPHS—

Example shown here is the safetygraph "Industrial Power Trucks" published by the National Association of Refrigerated Warehouses. The lessons are as follows:

- A. Never move your truck without looking in the direction you're going.
- B. Throw away your cowboy outfit when you climb onto your truck. Don't pull any crazy stunts or horse-play, and never drive your truck at an unsafe speed.
- C. Be courteous. Always give the pedestrian the right of way. Give him warning when you approach him. Make sure he sees you and is out of the way before you pass.
- D. Don't let unauthorized persons operate your truck.
- E. Park your truck in a safe place. Don't block aisles or exits.
- F. Load and carry safely. Handle every load like a crate of eggs.
- G. Inspect the truck daily. Report anything that needs fixing (don't try to fix it yourself), and don't operate the truck unless it's in 100% safe condition.
- H. Be proud of being a good driver. Remember that a power truck is an automobile, and that you can get into plenty of traffic accidents if you don't observe safe driving practices. Be alert, courteous and careful.



MODELS—

Lifting causes more injuries than any other plant activity. Mechanical man used by National Motor Bearing Co. is guaranteed to make the worker remember the wrong way (above) and the right way (below).



S.Q.C. ELIMINATES SERVICE BLUNDERS

Correcting clerical troubles became elementary after air line used statistical analysis to expose "who", "what", "when" and "how"

MOST HISTORY on Quality Control by Statistical Methods pertains to its uses in the factory, the laboratory, or the machine shop—where production processes and material products are involved. In air transportation, however, we are using it as a valuable tool for controlling important service functions.

Scientific, statistical analysis of the many manual and clerical details associated with our service operations has produced the following benefits:

1. Improved service to the customer.
2. Reduced costs.
3. Reduced errors.
4. Aid in training programs.
5. Systematized supervision.
6. Eliminated guesswork in processes. Told *factually* (often for first time) true extent of good or bad performance.
7. Provided continuous knowledge of quality level.

Payload Control

In this vital space control work, errors were reduced 86 per cent in less than three months.

As the name suggests, this Denver Operating Base function is responsible for accurate control of passenger and cargo space as sold and reported to it by our many sales offices throughout



By
DALE L. LOBSINGER

Fellow ASQC*
Superintendent,
Quality Control
United Air Lines, Inc.
Denver, Colorado

the country. Failures in the work adversely affect both revenue and customer acceptance of our service.

Eight to ten thousand space control messages are funneled in and out of this office each day. These pertain to the daily operation of some 650 flight segments. Posting clerks record contents of messages on appropriate

charts—a class of work which has as its primary requisite accuracy. Inadvertent under- or over-booking of passengers on a flight, or posting on wrong flights, could cost us as much as \$51.00 per airplane seat, if the flight involved happened to be a Mainliner "300."

Moreover, a passenger deprived of space because of a posting clerk's error could not exactly be expected to express praise for the Company. In the course of transporting 6,000 to 7,000 passengers every 24 hours, however, such clerical failures can and do cause us grief. The challenge, then, has been one of maintaining deviation from accurate control procedures at a minimum.

After some rather frustrating experiences of trying to judge the extent and nature of our error factor through customary procedures, it was finally decided to give the statistical methods of Quality Control a try. The results were immediate and quite gratifying. In one phase of the work alone clerical errors dropped from approximately 260 a day to about 111 a day in less than a month. By the end of five months the figure had gone to about 47 errors per day.

Important to recognize in this project is the fact that we were dealing with our single marketable product—airplane space, and with the passenger who must be induced to purchase that product on the basis of its service quality. Obviously, the fewer the errors in the service, the better the quality and the more frequent the purchase.

To gain the improvement indicated, the following simple techniques were used:

Statistics and Customer Service

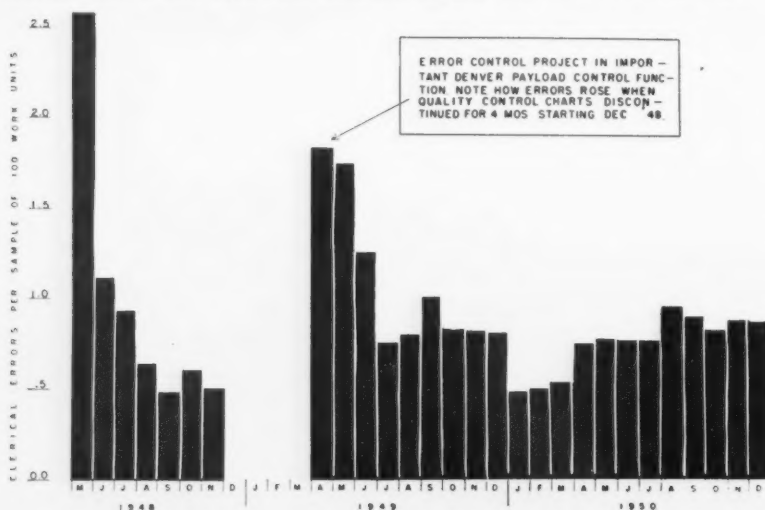
We took as a unit of measurement, errors revealed when comparing information found on messages with that which the posting clerks transcribed to the master charts. The process was complicated by the fact that some sixty employees participated in the action; that the action carried through three different work schedules; and that there were varying degrees of work peaking from hour to hour and from day to day.

With the help of an np chart 600 messages were studied each day in subgroups of 100 strategically spaced throughout the 24-hour period. The errors were listed on a specially prepared data sheet, which effectively categorized them for analysis. Through this approach we learned for the first time the true nature and extent of our difficulty.

Corrections became elementary once

* American Society for Quality Control.

FIGURE 1—Chart of clerical errors per sample work units. Note almost immediate drop in errors in June 1948, when statistical analysis first uncovered trouble spots.



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Dryseal is easy as pie to handle. Being dead-soft it

is easily bent with the hands. It is this same soft temper, and the ductility of the copper used, that makes Dryseal easy to flare for compression fittings without any danger of splitting. Economical tube sizes range from $\frac{1}{8}$ " to $\frac{3}{4}$ " O.D.

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NIFTY-50
one-coil
carton!**



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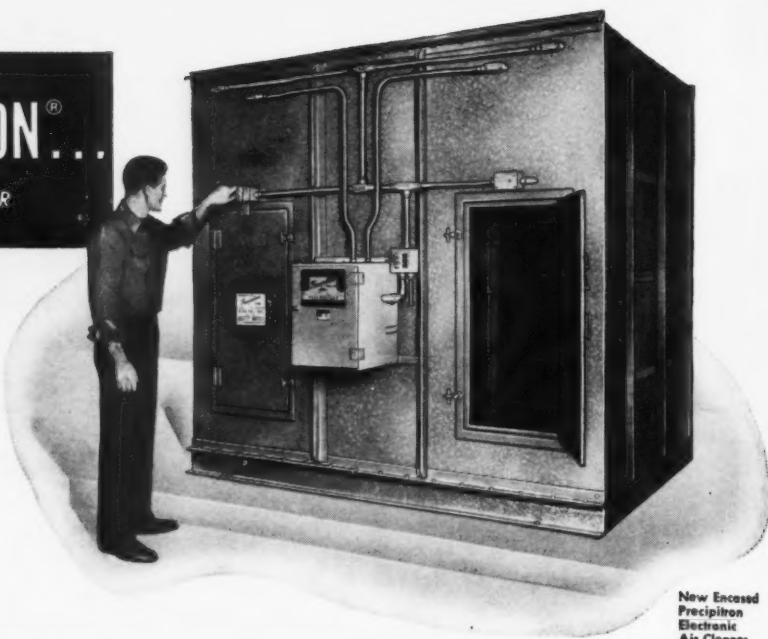
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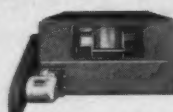
AIR CONDITIONING



HEATING



VENTILATING



AIR HANDLING



INDUSTRIAL FANS

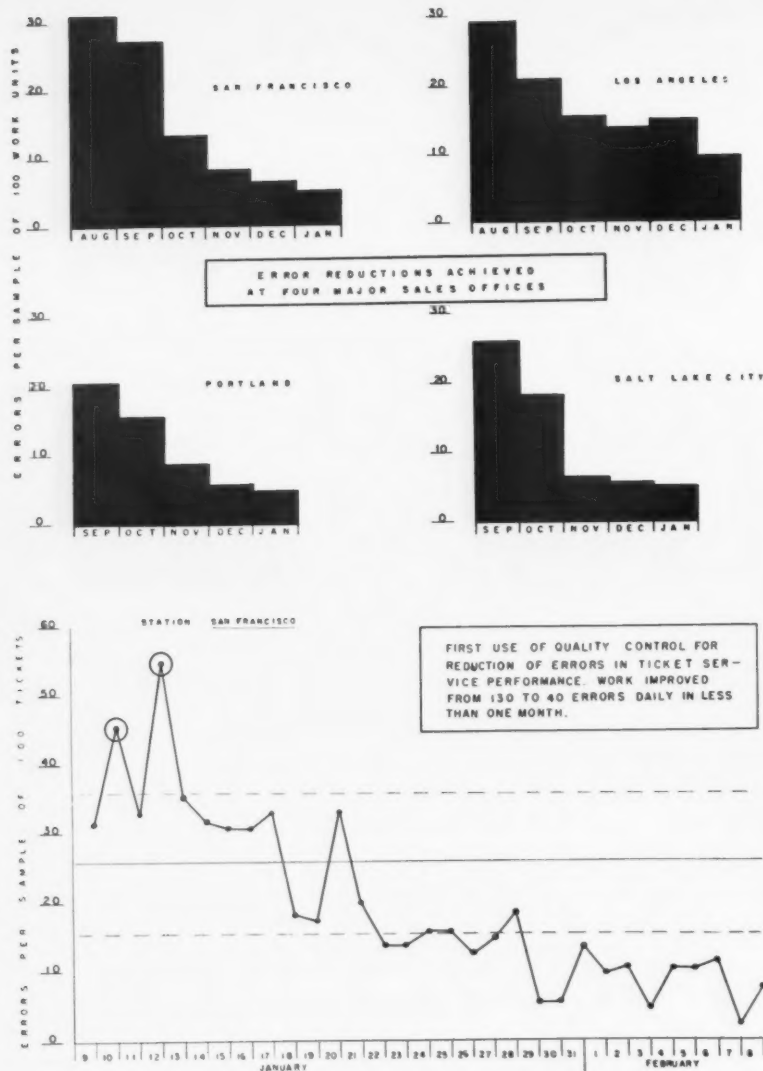


FIGURE 3 (Top)—Charted evidence of improved clerical efficiency at four offices.

FIGURE 4 (Bottom)—The results of applying statistical quality control to ticket service errors and irregularities. Errors were reduced 65% in less than 30 days.

guidance toward improvement. Virtually from the beginning of the project errors in the work took a downward trend. By the end of the first 10 days the average errors per sample had been reduced to 27.81, and during the succeeding 30 days it went to 13.31.

This was real progress, and more was yet to come!

The Results Are Evident

Los Angeles, third largest office on the system, was able to go from a quality level of 29.50 errors per 100 units of work to 15.23 within eight weeks. Portland and Seattle have gone from 20.65 and 24.35 respectively to 15.30 and 19.18 within a month, and their work is just getting started. At each of 10 major stations where the new methods of control were applied

improvement followed a similar course. See Figure 3 for results at four typical offices.

Attention is suggested again to Figure 2. Here you have the basis for two valuable aids added to the office of management. Firstly, this data sheet provides daily and systematically an unbiased and factual picture for the supervisor to judge just what the men and facilities under his jurisdiction are accomplishing. Secondly, the real training needs of workers are reflected in such manner as to enable one to save time in choosing which phases of instruction should be given to different individuals. Think what this latter can mean in rapidly determining how much and what training should be given to new personnel!

Feasibility of applying Statistical

Quality Control to ticket service errors and irregularities was recently established in one of our major offices when the methods accounted for an error reduction of 65 per cent in 30 days.

The tickets to which we refer are those sold to customers in payment for space on the airplane. At the office where the test project was begun approximately 300 such tickets are issued daily. Through control chart and data sheet procedures a single sample of 50 tickets is studied each day.

Basic data showed the quality level of ticket preparation at the start to be 26.25 errors per sample. From Figure 4 it is noted that this dropped to an average of 9 errors per sample within a month.

It is both interesting and important to note that maximum estimates regarding extra time required to handle the samples run 30 minutes per day. Moreover, the clerks handling the tally are very enthusiastic about the chart and data sheet method of portraying performance. Since these same clerks were responsible for correcting errors as turned up in auditing all tickets, it becomes clear that instead of requiring extra time the overall work is actually reduced by the decrease of daily error totals from approximately 130 to 40 per day. In other words, the additional 90 errors that they originally were correcting each day would have taken more than 30 minutes.

As in Payload Control and Reservations the Quality Control data sheets are serving importantly to apprise supervisor and worker wherein their difficulties lie. Once more, also, we find them containing great value for the training of both old and new agents.

"X-ray" Form of Analysis

Here is one more phase of our general service to the customer in which the quality level and acceptability is in direct proportion to the error content of the work. From a competitive standpoint, we know, therefore, that the error factor must be maintained at a minimum. The statistical form of analysis is enabling us to do just that.

What can be listed as the most significant contribution Quality Control by Statistical Methods has made to our type of organization? It could be named as the X-ray form of analysis it provides through which we are enabled, as never before, to gain realistic perspectives and knowledge of just what our many detailed processes are doing. With such increased understanding it becomes a greatly simplified task to select the means of performing optimum service at minimum cost.

Your production lines are defense lines!



Bombs on belt line being fed into booth for spraying.

Consult an Industrial Finishes Specialist

Manufacturing for the armed services — whether it's bombs or tarpaulins, tanks or communications equipment — demands specialized knowledge in the finishing of every vital component.

In the case of bombs, for instance, the inside is likely to be protected with acid-proof finishes to prevent spontaneous combustion between high explosives and uncoated metal. Outside, the bombs, until put into service, must be protected against every conceivable kind of weather condition.

Your Industrial Finishes Specialist knows the latest government specifications, the proper finishes to do the job.

Whether you're manufacturing for the armed services or for civilian markets, it pays to consult an Industrial Finishes Specialist. He's the technically

trained sales and production-minded representative of your Industrial Finishes Supplier.

He can help you lower production costs, develop special finishes, meet government specifications, add durability and beauty to your consumer products. Remember—more and more of your customers *start buying with the finish in mind.*

The better the finish

the better the buy



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Fifth in a series on water problems

USE LESS WATER AND SAVE DOLLARS

By RAY W. HAWKSLEY, Chemical Engineer, San Francisco, Calif.

CERTAIN West Coast localities are suffering from an increasing scarcity of water. While new sources of water are under study, and being developed, it is probable that a definite policy of water conservation will always be necessary on the Pacific Coast, and particularly so with increasing population and increasing industrial activity.

According to some estimates, industrial uses account for 25% of the national consumption of water. Irrigation and sanitary use of water admit of only slight possibility for savings, but many industrial plants have an excellent chance to save water. Beside the obviously desirable public relations aspects of conserving the general water supply, there are important economic considerations as well. A well planned water conservation program in a par-

ticular plant will often produce very attractive dollar savings.

A few industries took an early initiative in appraising their own water use practices that were in need of revision, and have achieved substantial savings in their water consumption, notably the petroleum products industry and the paper and pulp industry. In other industries, however, little has been done in this direction, and there is much room for improvement.

Check Your Plant

A recent survey of water use by industry conducted jointly by the Conservation Foundation and the National Association of Manufacturers Committee on Conservation of Renewable Natural Resources showed the following average usage of water in industrial plants:



Photo courtesy The Marley Co., Inc.

Recirculating cooling water system at Holly Sugar Co., Alvarado, Calif., saves about 2,200 gal. per min. over former method of using water once and then disposing of it.

TABLE 1

	Plants taking in less than 10 million gal./day %	Plants taking in more than 10 Million gal./day %
Process water	36	32
Cooling water	23	54
Boiler feed	12	9
Sanitary and service..	26	6
Other purposes	3	4

(NOTE: Adds to more than 100% because of inclusion of re-used water by some plants reporting.)

Is there a possibility that your plant represents one of the holes in "Water Waster's" leaky bucket? Probably so. And it's important that the holes be plugged because numerous Western localities are suffering a constantly increasing scarcity of water.



One effective way to economize on water is to use the same water for more than one purpose, or to recycle it and use it again in the same equipment. The survey disclosed the following percentages of re-use by different types of industry:

TABLE 2

	Percentage re-used
Apparel and textiles.....	14
Autos and aircraft.....	25
Chemicals and drugs.....	35
Foods, beverages and tobacco.....	22
Iron and steel.....	25
Leather.....	12
Lumber and furniture.....	23
Machinery and tools.....	15
Non-ferrous metals.....	18
Optical, medical and scientific.....	21
Paper and pulp.....	52
Petroleum products.....	98
Plastics.....	19
Stone and glass.....	25
Toys, novelties, sport goods.....	19
Miscellaneous.....	22
All plants combined.....	24

Continued on page 52

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Accurate over-all height of Lukens Heads simplifies the job of
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Lukens will gladly advise you on Head applications. Further in-
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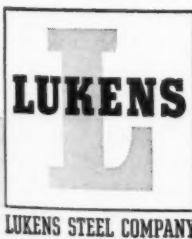
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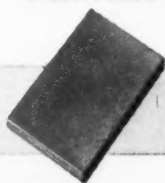
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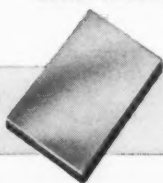


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STEEL PLATE



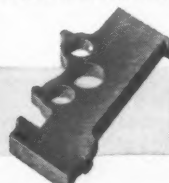
CLAD STEELS



HEADS



STEEL PLATE SHAPES



WAYS TO SAVE WATER

... Continued from page 50

What are the opportunities for use of process water? If it is being used for washing, such as washing of spinach in a cannery, the washing should be arranged countercurrently, so that the dirtiest spinach is washed first by the dirtiest water; and the last washing only, performed with fresh water.

In one plant recently surveyed,

there were seven washings of a fresh vegetable in a cannery, and in each stage, the water was discharged to the sewer! With countercurrent washing, an 85% saving in wash water would have been possible in this case.

Sometimes process water can be run into a settling tank or basin and re-used, or filtered and re-used. The economy of this depends, of course, on the cost of water, space available, and cost of equipment necessary to perform the purification.

Among the larger users, cooling is by far the most important of the several purposes shown in Table 1. More than half the water intake is used in this way. Conservation of cooling water therefore presents an excellent opportunity for savings.

In many plants, water is run through heat exchange equipment only once, its temperature raised, and then it is discharged to waste. This practice is hardly justifiable economically even when the water is pumped out of the plant's own well. If the water is purchased, this becomes an extremely wasteful practice, but a prevalent one nevertheless.

Recirculating Effects Savings

Recirculating the cooling water through a cooling tower will effect large savings in water. A cooling tower functions through the cooling effect obtained from the evaporation of a certain amount of the circulating water. It is a simple matter to estimate the amount of water saving possible by this means. On the average, the consumption of water for cooling by evaporation is 1% for every 10 degrees Fahrenheit that the water is cooled, plus an additional small amount of "bleedoff" necessary to maintain proper mineral concentrations.

In the tower shown in the photograph on page 50 the water is raised to 125 degrees in cycling through the sugar plant, at the rate of 2,500 gallons per minute. The tower is designed to lower this temperature to 77 degrees, a range of 48 degrees. This amounts to an evaporation loss of 5%.

The savings in water are therefore approximately 2,200 gallons per minute, with allowance for bleedoff, or 3,168,000 gallons per day.

Steam Should Be Recovered

Another opportunity for water savings is in the recovery of condensed steam, for return to the boiler to be reused. Although boiler feed requirements in Table 1 apparently rank lower in magnitude than other uses, very substantial dollar savings are possible with return of usable condensate.

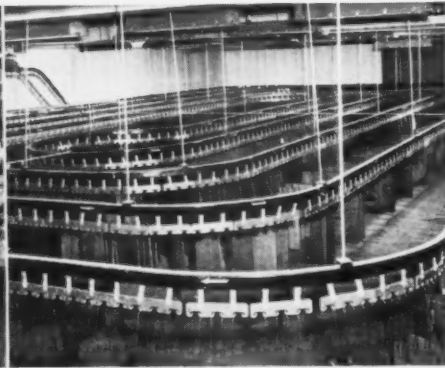
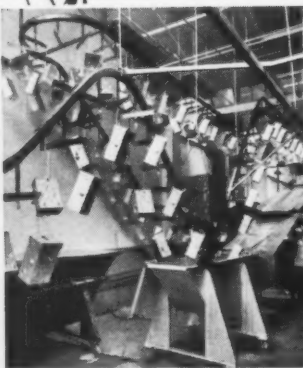
The water evaporated by a 500-horsepower boiler is about 2,000 gallons per hour. If none of the condensed steam is recovered, the boiler will require this much fresh makeup water. The system is then said to be "100% makeup." Every gallon of makeup water must be heated from around 65 degrees up to boiling, and every gallon must be softened or otherwise treated to make it usable in the boiler. These are both expensive processes.

Assume, however, that 50% of the



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production line

Really Rolling!



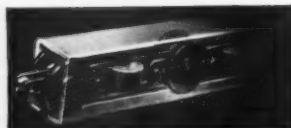
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* * *

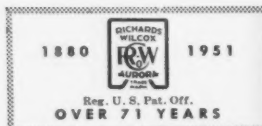
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condensate is recovered, and returned to the boiler. The returned condensate is substantially distilled water, and therefore does not require treatment of any kind, so that a 50% saving in treatment costs is effected. In addition to this, the condensate is hot, and returns to the boiler close to boiling temperature, so that there is an additional saving in fuel. Assuming average treatment costs and average fuel costs, the total saving through recovering 50% of the condensed steam is approximately 70¢ per hour.

Considerably higher percentages than 50% of the condensate are recovered in many plants, with consequently greater savings in fuel and treatment costs. The possibility that the condensate may be contaminated with oil, leaks in steam jacketed equipment allowing contamination by product being processed, or other causes, needs to be considered. Such contamination can often be minimized or

Reprints Wanted?

THIS ARTICLE on conservation of water in industrial plants is the fifth of a series dealing with industrial uses of water. Preceding installments covered qualities of water, with a tabulation of water characteristics in a large number of Western cities, water softening and boiler feedwater treatment.

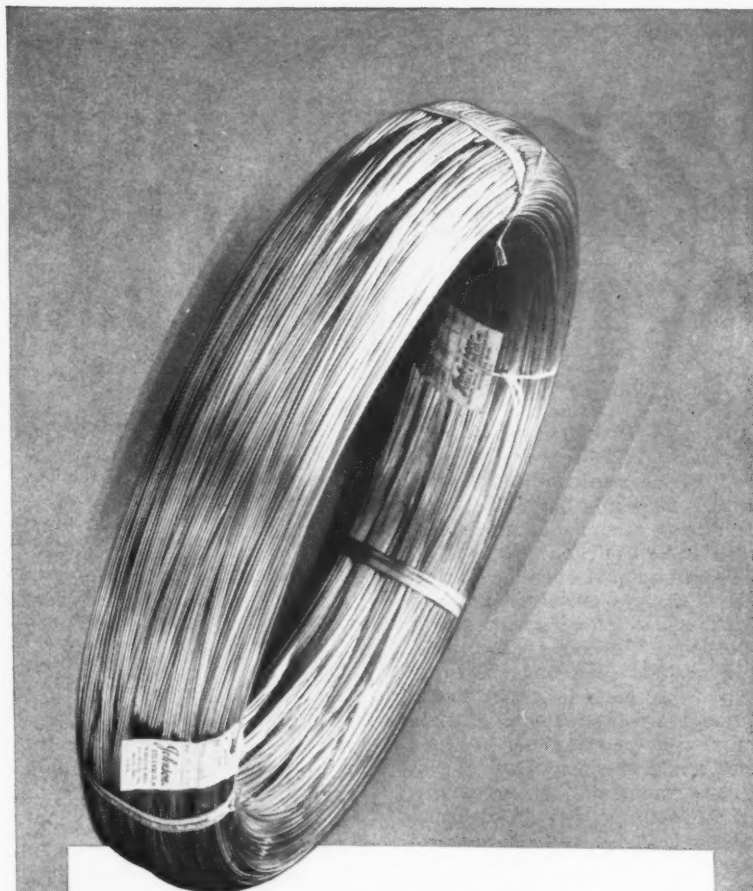
Treatment of water for cooling will be the subject in the June issue, dealing with the prevention of scale, corrosion, algae and slime in cooling systems.

The final article, in July, covers corrosion in pipe lines, boiler plants and equipment. Discussion of protection and remedies will include both chemical and cathodic methods.

If there is sufficient demand from our readers, the entire series will be made available in reprint form. Those interested are requested to notify *Western Industry* immediately.

eliminated by proper filtering or other treatment, so that the mere possibility of contamination need not deter management from planning proper recovery of condensate.

On the Pacific Coast, the survey mentioned earlier in this article showed a 35% increase in water intake per plant from 1939 to 1949, which is roughly in proportion to increase in total "value added by manufacture" according to the 1947 Census of Manufactures. However, this was for plants which had been in existence in 1939, and through 1949. With new industrial plants being built, new load will be added to Western water resources, making the question of conservation an increasingly important one.



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The Western Industrial Distributor Must Know MORE Than HIS Business!

PEARL HARBOR was on the line.

"We need torpedo hoists," begged a voice from out in the Pacific. "How many chain hoists can you load on a ship for us right away?"

The circled number on the calendar back of the sales manager's desk read "8." Two lines above it was the month, "December." Above the year, "1941."

He hesitated. His firm was an industrial distributor in a large Pacific Coast city, looked to by a dozen branches of the armed services as a quick source of supply for thousands of items wanted daily, if not hourly, even at that time. Beyond lay scores of firms loaded up with government contracts, and still further in the distance were hundreds of tried and true customers still doing civilian business.

He had just 50 chain hoists on hand. Yearn as he might, he was unable to picture himself as possessed of the power to duplicate the miracle of the five loaves and two fishes. What was the best answer?

"We can let you have 25," he replied regretfully, and started to explain. But just then a big hand closed down over the telephone mouthpiece. It was the president, leaning over his desk, listening intently.

"We've got 50," snapped the president, "And we'll give them 50. Get those hoists on the truck quick. Anything we have is theirs, if they want it."

That same day the hoists, all 50 of them, were aboard ship. And this was pretty much the story of those early

THIS ARTICLE was prepared from information supplied by the following members of distributing firms:

J. H. Ruddell, president, National Supply and Machinery Distributors' Association (president, Central Rubber & Supply Co., Indianapolis).

Harold E. Torell, vice-president, same association (president, Syracuse Supply Co., Syracuse, N. Y.).

Wallace Campbell, president, Campbell Hardware & Supply Co., Seattle.

Robert A. Donovan, president, Machinists' Tool & Supply Co., Los Angeles.

A. J. Glesener, president, A. J. Glesener Co., San Francisco.

W. A. Haseltine, president, J. E. Haseltine & Co., Portland.

A. W. Lobn, executive vice-president, Ducommun Metals & Supply Co., Los Angeles.

E. H. McLaughlin, president, Union Hardware & Metal Co., Los Angeles.

Ralph V. Vincent, general manager, C. W. Marwedel, San Francisco.

days in the war. Steel sheets and other supplies that poured out of distributors' warehouses all along the Coast into ships' holds or piled up on decks (air cargo was almost unheard of then, to say nothing of air lifts), were a major factor in putting the remains of a badly battered fleet into running order, in outfitting air bases and generally laying the foundation for a glorious victory four years later.

It was the famous Confederate cavalry general, Forrest, who said the secret of winning battles was to "git

thar with the most men fustest." In peace time (and also in war, either "cold" or "hot") the industrial distributor does much the same thing, namely, to be on hand with "the most things fustest."

On the Pacific Slope—and for the purposes of this article we will lift the Denver distributors over to the West side of the Rockies—this is particularly true, because these supply houses have to carry so much more stock on their floors than elsewhere in the country. Where the manufacturers are close at hand, the industrial supply house can replenish its stock overnight, but on the Pacific Slope, it is a different story.

For example, an industrial supply house in Buffalo could very successfully carry on its activities with an inventory of \$250,000. Yet leading supply houses in the West require inventories running anywhere from \$600,000 to \$2,000,000 without doing proportionately greater sales volume.

Why Distributors?

Industrial distributors, or mill supply houses as they are also commonly called, grew up because manufacturers of tools, builders' hardware, etc., found it too expensive, as industry developed and became more decentralized, to sell direct to the consumer through their own sales organizations. The trend has grown to the point where such houses in the West stock from 75,000 to 100,000 items.

As industry has grown, distributors have kept pace by augmenting their sales departments with specialized service engineers, particularly in the fields of lubricating oils, cutting tools, transmission equipment and other highly specialized products. In the West particularly distributors also perform service operations, which help the customer out of many a tight spot.

How a sense of values in regard to small units may be easily overlooked is vividly illustrated by a comparison of

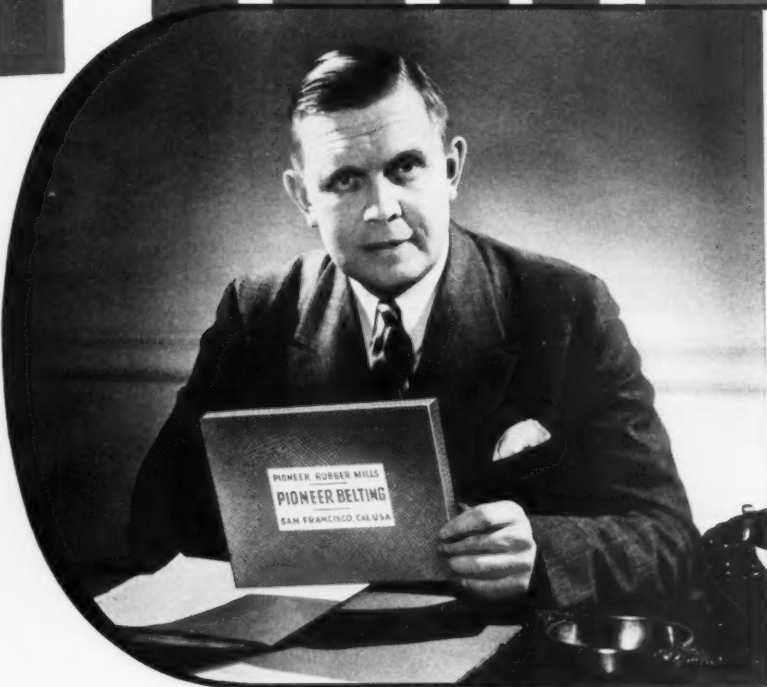
Continued on page 56

SERVICES THAT A DISTRIBUTOR PERFORMS . . .

1. Is a convenient single source for a variety of items.
2. Carries a wide range of dependable, high quality products.
3. Provides emergency services that shorten shutdowns.
4. Saves plant storage space and simplifies purchasing work.
5. Supplies valuable and prompt sales assistance.
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May, 1951 — WESTERN INDUSTRY

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THE WESTERN DISTRIBUTOR

... Continued from page 54

the unglamorous supply business with machine tools, where large units of mechanical wizardry greet the eye. At the business end of a great machine tool will be found a comparatively small milling cutter, grinding wheel, drill or reamer, revolving or reciprocating at selected speeds and feeds. The huge machine itself contains many standard component parts taken from some industrial supply distributor's shelf.

Aside from all the glamour, the essential function of the great machine is to translate the rotating motion of an electric motor to the tool which is in contact with the material on which work is to be done. If this tool is not available in proper size and type, the big, glamorous machine is useless. Thousands of these tools are of standard design and delivered daily by distributors who frequently contribute to the selection, the proper usage, care and maintenance.

He Must Know the Answer

In order to merchandise from 75,000 to 100,000 items successfully, the distributor has to know his business, because all these items are either of a technical or semi-technical nature. When a customer walks in who does not know the difference between an SAE and a USS thread, (and the number of such people is surprising), he must be intelligently served if the distributor expects to get future business from him.

With very few exceptions, the manufacturer does not maintain an office in each of the major cities on the Pacific Slope, which means that the distributor has to be the technical expert on each of the lines he handles. In other words, a general line salesman must be equipped and have the know-how to check the general accuracy of a micrometer, or he may be called upon to determine why twist drills are breaking. His advice might involve a complete new set-up on the bank of drill presses being used.

He Must Know His Entire Line

Another complicating factor in the West is the fact that the area does not have many large industries, but does have literally thousands of small industrial plants, machine shops, etc. This means that a salesman, whether inside or outside, must know his entire line, because his first call in the morning may be on a tool and die shop, the next on a welding establishment, and so on. In the East, industry has developed to a point where an outside

Continued on page 58

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Manufacturers of Diesel and Gasoline Engines, Railroad Products, Locomotives, Earth Drills, and Material Handling Equipment.

THE WESTERN DISTRIBUTOR

... Continued from page 56

salesman can specialize on a line of products or a type of industry.

He Is An Unpaid Consultant

The salesman necessarily becomes unpaid consultant to his customer, giving him practical pointers on many things, showing him how to substitute one material for another in times of shortage, helping him to develop new applications and processes. This sort of thing has been particularly helpful to young Western manufacturing

plants; in fact distributors have more than once showed the young concern how to handle its credits and office procedures, and are even looked to as metallurgists.

An example of how the distributors have looked ahead is the fact that they stocked aluminum pipe long before there was any great demand for it, realizing that its day would come eventually.

The fact that Western houses handle steel sheets, non-ferrous metal, abrasives, power transmission equipment, heavy machinery and welding

JOINT national conventions of the American Supply and Machinery Manufacturers Association, the National Supply and Machinery Distributors' Association, and the Southern Supply and Machinery Distributors' Association will be held in San Francisco June 10-13.

equipment makes the jaws of their eastern brothers drop. Back there all this type of material is provided by houses who sell nothing but one line, whereas in the West the industrial consumer wants to have a source of supply which will keep his plant in operation.

Another function in the West is that of public library. Time after time the telephone conversation begins, "We know you do not handle such an item, we know that no one else in the city handles it, but can you tell us where to go in the East?"

Confidence and Cooperation

The relationship between the mill supply distributor and the various manufacturers whose lines he stocks necessarily depends on confidence and cooperation, because the distributor contracts can be terminated by either party on stipulated short notice.

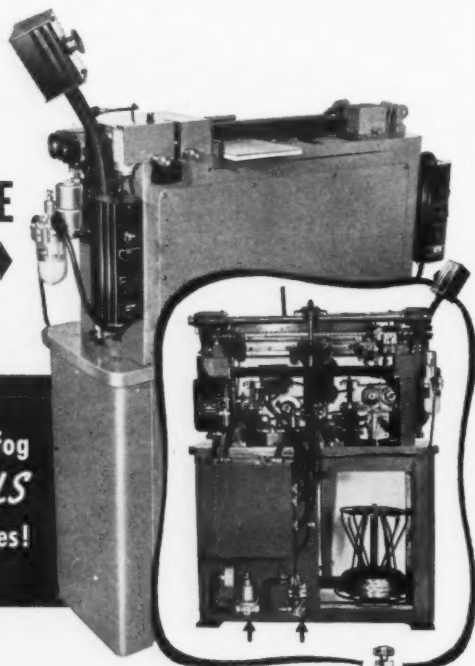
In slow or normal business times, manufacturers are in great need of good, sound, hard-working distributors to keep their factories running, while in periods of rearmament and government purchases, such as today, the distributor is dependent upon the manufacturers' support and ability to produce. Obviously loyalty on both sides is essential to a harmonious and successful relationship.

Naturally when there is accelerated business activity, as at present, many marginal operators seek factory contacts to build up their volume to a satisfactory point, and any manufacturer who can produce and deliver can easily increase the number of his outlets. The question the manufacturer has to decide is whether the newcomer will be a satisfactory account in the long run, or whether he is simply penalizing sound, substantial supporters by diverting some of his output to a concern that may be out of the picture when the rearmament program is completed.

A major argument in favor of the manufacturer distributing through a supply house, instead of setting up individual warehouse facilities is that it saves him expense. He can operate on a smaller inventory and wastes less space on stockrooms. He does business with a few large customers instead of a host of small ones. He is saved clerical work, forms, delivery problems

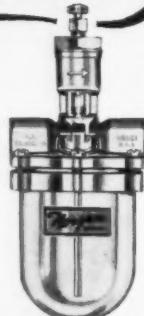
NORGREN OIL-FOG LUBRICATION EXTENDS DIE LIFE MANY TIMES

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CLEANS and COOLS
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Spiral binder SB-6, made by Spiral Binding Company, New York, coils galvanized wire thru carbide dies at linear speed of 3,500 inches per minute. It incorporates a Norgren Lubricator that injects an air borne OIL-FOG thru the dies with amazing results: **Die life is extended many times... Flaking is reduced to a minimum... Air flow maintains safe die temperature, and cleans the die of flakes and other foreign matter.**

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and credit risks, to say nothing of salaries, rent and traveling expenses.

Furthermore, his information on sales conditions and trends affecting the future of the area tends to be limited, and he also finds himself a competitor of the distributor, with all the resulting handicaps therefrom. Distributors feel that a number of recent instances of manufacturers discontinuing their West Coast branches and local offices in the last year and placing their lines in the hands of distributors is due, at least in part, to the fact that these branch operations are becoming unprofitable.

Of course many manufacturers leave the warehousing and selling of their products with the mill supply house, but maintain branch offices or have direct representatives, working with the distributor in either case.

Where consumers buy direct from the factory, as is frequent in the aircraft industry, they often find it necessary to fill in from distributors in order to avoid delay. In the case of smaller plants buying direct from a metal mill, the distributor often has been called upon to supply material to finish the job.

Allocations Based on Consumption?

A peculiar situation exists currently on the West Coast, and particularly in Southern California, with regard to the relation between manufacturer and distributor. The rate of increase in the metal cutting industry for Southern California has outstripped the average of the balance of the country, for obvious reasons, such as the effect of the rearmament program on aircraft, guided missiles, oil tool equipment, etc.

Allocations of products by manufacturers based on the consumption of their products in the last four or five years would obviously create shortages of vitally needed materials on the West Coast. At the same time, such areas as Detroit would have mill supply items running out of their ears.

West's Growth Must Be Recognized

Many manufacturers distributing to the West have not kept adequately informed on the degree of industrial development in the West. The fact has still to penetrate into many minds that 4½ million people have been added to the Coast's population since 1940, an increase of nearly 50%, that the Pacific Coast is the second richest consumer market in the nation, that California has risen from fifth rank in population in 1940 to second place, that Los Angeles is now the fourth largest city in the United States and has half the country's aircraft industry within its metropolitan area.

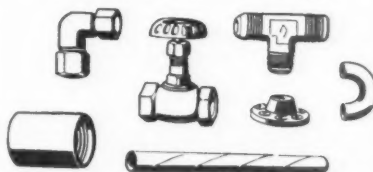


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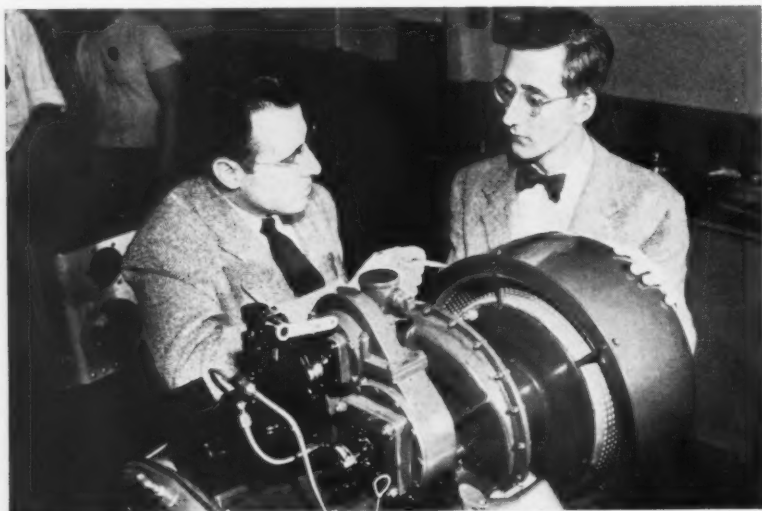
...and a Complete Line of Tools, Rubber, Wire Rope, Industrial Supplies and Machinery

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LONG BEACH • STOCKTON • SAN JOSE • VENTURA • SACRAMENTO • AVENAL • FRESNO
SANTA MARIA • CUYAMA • NEWHALL • TAFT

In developing the 200-lb. 175-hp. Model 502 gas turbine engine, Boeing Airplane Company has spent four years in an extensive research program aimed at obtaining . . .

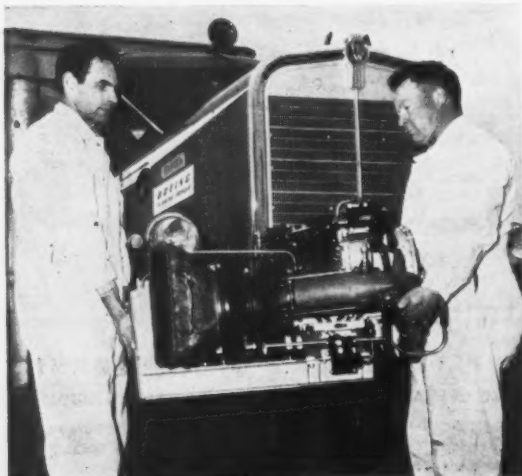
LONGER LIFE FROM THE LOWER ALLOYS

By W. L. SLOSSON, Metallurgist, Boeing Airplane Company, Seattle, Wash.



ABOVE—Many facets of Boeing's vast research organization have contributed to development of the firm's gas turbine engine. Here, acoustic engineers examine a lightweight filter which they designed to overcome problem of compressor noise. The filter is made of aluminum and Fiberglas.

BELOW—The 200-lb. engine can be easily lifted by two men, left. At right, identical truck units, one powered by the Boeing gas turbine, the other by a diesel power plant of similar rating. The gas turbine occupies only 13% as much space.



A CENTRIFUGAL compressor is used on the Boeing gas turbine. The impeller is machined from a 14S aluminum alloy die forging and the finished part heat treated to the T-61 condition. 14S aluminum alloy was chosen for this application because of the combination of good corrosion resistance, forgeability, and high mechanical properties at room and elevated temperatures offered by that alloy.

Burner liners are subjected to very stringent operation conditions because of the extremely high temperatures and thermal gradients imposed on these parts during the combustion process. Such thermal conditions promote rapid warping, cracking and oxidation of the liner material unless liner design is carefully controlled so that maximum cooling is provided by compressor air.

Several liner designs and sheet alloys including AISI 321 bare, stainless-clad-copper, ceramic coated AISI 321, and AISI 310 bare, are under test by Boeing in a program aimed at developing long life liners from lower alloy materials. Current burner liners are fabricated from .050" Inconel sheet.

Withstanding High Temperatures

Nozzle boxes are similarly exposed to high temperatures and thermal gradients promoting warping, cracking and oxidation, although not to the degree experienced with burner liners. Proper combustion chamber design has great influence on nozzle box material selection since control of nozzle box inlet gas temperatures and distribution is performed by the combustion chambers.

The first stage nozzle box is fabricated from AISI 310 sheet and precision cast H.S. 30 alloy blades. The second stage nozzle box is fabricated

Continued on page 62



Don't Let IRON and STEEL SCRAP Gather Cobwebs!

Somewhere, back in a corner of your plant or shop, there's some scrap iron and steel. Maybe quite a pile, gathering rust. Maybe some obsolete machinery, long unused. Maybe odds and ends that total many tons. You've meant to have it hauled away, but somehow it's still around.

Now's the time to sell it!

Call the nearest scrap dealer; ask him to give you a price. He'll pay good money for it. Prices are high . . . the nation's steel plants need scrap badly. With a stepped-up defense program under way, scrap is more than ever a vital ingredient of steel production. Industry must help take up the slack—*fast*.

A constant flow of scrap means greater tonnages of iron and steel. It means more finished products made of iron and steel. You can help . . . and help yourself as well. Get that scrap in circulation. Get it on the job!

BETHLEHEM PACIFIC COAST STEEL CORPORATION

General Offices: San Francisco

BETHLEHEM PACIFIC



If you don't know the name of a scrap dealer, look one up in the yellow classified pages of the telephone directory. You'll find a listing there.



LONGER LIFE FROM THE LOWER ALLOYS

... Continued from page 60

from AISI 321 sheet and precision cast AISI 310 alloy blades. Here again, several materials are under test or scheduled to be tested in a search for satisfactory use of lower alloys.

Both the first and second stage turbine wheels are fabricated by welding H.S. 30 alloy precision cast blades to a Timken 16-25-6 alloy forged hub. Welding is done by the manual metal arc method using a 19-9 WMo alloy electrode. Small size of the Boeing

turbine wheels in conjunction with the quantity of blades on each wheel dictates welding the most practical method of blade attachment. Operation of many wheels on test engines and in spin pit operations has shown the weld very reliable under normal operating conditions.

Bi-metallic Cast Wheels

In an effort to obtain a lower cost wheel concomitant with higher production, Boeing is currently conducting tests on both a bi-metallic cast turbine wheel and an integral cast blade ring assembly. On the former wheel

type, the hub is cast around the bases of individually cast blades, while on the latter type, the blades are cast in an integral ring and the blade ring welded to a forged or cast hub. The bi-metallic cast wheel shows considerable promise in tests conducted.

The major difficulty experienced with turbine wheels in engine operation is blade failures. Failure of the blades can be caused by impact with foreign articles going through the wheel, fatigue or thermal shock.

Main turbine shafts on the Boeing engine are fabricated from SAE 4140 Steel, heat treated to 150,000-170,000 psi. All the gears in the reduction unit are case hardened for maximum service life, with SAE 3310, 4620 and Nitralloy utilized.

Extensive use of sleeve bearings has been promoted throughout the engine with considerable success. Continuous cast leaded bronze, steel backed copper-lead, and babbitt coated aluminum bearings are currently being utilized.

Material Inspection

Many methods of material inspection are utilized on gas turbine components. Extensive X-ray and Zyglo inspection is performed on all turbine blades and turbine wheel assemblies throughout fabrication. All turbine wheel hub forgings are both ultrasonic and Zyglo inspected for external and internal flaws.

Shape and nature of the impeller forging does not permit reliable ultrasonic inspection under current known procedures; however, thorough Zyglo inspection of the impeller is accomplished at various stages during machining operations.

A final quality check on each impeller and turbine wheel assembly is afforded by a 25% overspeed room temperature proof spin in a spin pit, followed by Zyglo and X-ray inspection of each component. All highly stressed magnetic parts are subjected to complete magnaflux inspection, and X-ray and Zyglo inspection control exercised over all light alloy castings.

A measure of reliability of the Model 502 gas turbine was recently demonstrated by successful completion of 550 hours cycle test and continuous endurance operation of a current design engine on a test stand. This time included 400 hours operation at rated speed and power output. (36,000 rpm. on first stage and 175 hp. delivered at output shaft.)

All major components, except burner liners, completed this test without replacement or overhaul. Original burner liners were removed after 300 hours operation because of excessive warpage that could not be satisfactorily repaired.

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RIGHT—New White 3014 operating from the Sacramento Retail Yard of the Diamond Match Co. The 3014 is completely new—designed for today's delivery problems.

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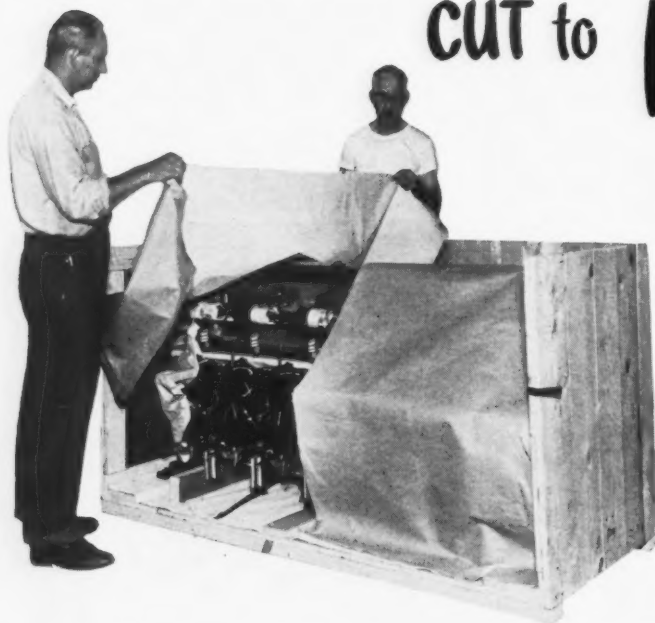


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	<input type="checkbox"/> Transportation Equip- ment—Aircraft, Auto, Naval, Railroad, etc.	<input type="checkbox"/> Others:

Let Your Foremen Help Shave Costs

By ELMER A. DAGENAIS
Works Manager
Kroehler Manufacturing Company
Inglewood, California

ONE OF THE MOST effective ways of controlling indirect labor is in the hands of the foreman or supervisors of the particular departments.

A suggestion I have to offer in making a cost study of your indirect labor is to have each department supervisor make an analysis as to the indirect labor charges necessary in his particular department; establish that as a budget, and whatever he turns in as necessary, use that in figuring your costs.

Do not try to shave down the indirect labor figure which that particular supervisor may turn in, as he should know, better than anyone else, what is required in the way of indirect labor properly to operate his particular department.

After he turns in his figures, broken down by the various job classifications, furnish that supervisor with a weekly statement comparing his actual operating costs to the budget which he, himself, established. One would not have to operate under this type of program for too many weeks until it would become very apparent as to whether the budget was established in excess of the needs or whether it was too low.

A Basis for Checking

If the operation of the department fluctuates greatly from the setup established by the supervisor, a careful check should be made at that time to determine why. In fact, on these weekly comparisons make the supervisor responsible for explanations as to why the fluctuation between the actual expenditure for this indirect labor and the amount that he established as being satisfactory in order to meet the productive requirements in his department.

You will be surprised as to the sincerity and desire of the supervisor to stay within the budget which he, himself, established. Of course, a careful explanation at the time of establishing the budget should be made to the supervisor, calling to his attention that the amount of business which you enjoy as a manufacturer is determined entirely by the quality and the price of the article which you manufacture, and that the price must be in line and the costs must be held down in order to provide sufficient business to keep everyone on the payroll.

Dutch Oven Beside Stack For Soot-less Smoke

ENDEAVORING to cooperate with the Los Angeles Air Pollution Control in every effort to relieve smog conditions, the Fluor Corporation has converted its incinerator from a direct to a smokeless indirect type of burner at a cost of \$13,000, according to F. M. Stephens, general manager of the manufacturing division, who had charge of the work.

Since Fluor is the largest producer of redwood cooling towers on the West Coast, the waste resulting from their manufacture has always made incinerator disposal a problem for the company, Stephens stated. The cost to replace Fluor's present oven would have been prohibitive, so it was decided to add to the present facilities. The unusual arrangement called for a Dutch oven to be built beside the stack, located at the home plant, 2500 South Atlantic Blvd.

As the newly designed incinerator now works, fire is started in the oven each morning with office waste paper and wood scrap. When this is burning well, the cyclone dust dispensers on top of the oven are started up and suck the sawdust and shavings directly from the mill storage bunker into the oven.

"By the use of vents, the flame heat is high enough to cause almost complete burning," Stephens said in explaining the operation. "By cooling the remaining smoke on a series of baffles, the soot and fly-ash is dropped and caught, resulting in soot-less smoke."

Fluor believes that it has achieved an effective and economical solution to the smoke problem, and invites other companies with similar problems to inspect the unit.

General Petroleum Has Safest Refinery Workers

A GENERAL PETROLEUM refinery worker is more than $3\frac{1}{2}$ times as safe on his job as an average petroleum refinery worker, and more than five times as safe as an average industrial worker, according to statistics compiled by J. H. McKenzie, manager of GP's safety department.

Other evidences of this company's excellent safety standards are exhibited by National Safety Council's 1950 awards in its Petroleum Section. Council's final bulletin states that General Petroleum's marketing department leads all others for safety during 1950, and its natural gasoline division was one of five, sharing first place honors.



LEFT—View of incinerator stack billowing smoke before \$13,000 smokeless burner was added. CENTER—Fluor workers shovel mill ends and scrap into newly-installed Dutch oven. RIGHT—Soot is nearly 100% eliminated and smoke can hardly be seen.

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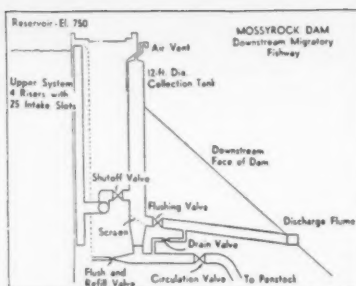
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Dam the River . . . But Save the Fish

TACOMA (Washington) City Light Department proposes to provide adequate fish protection on the Cowlitz River, should it be permitted to build the Mossyrock and Mayfield dams. Here is how the Department proposes to do it:

Referring to the accompanying drawing, the system would have risers on the face of the 185-ft. high dam, each 150 ft. in height with openings about 4 in. wide and 2 ft. high spaced at 6 ft. intervals. The risers are connected to vertical collection chambers by passages 5 ft. in diameter within the dam structure. The collection



chambers would be 12 ft. in diameter and extend more than 100 ft. to the top of the dam to permit the fingerlings to seek their own level during the collecting operation. Circulation would be induced at the openings of

the risers by connecting the system to the penstocks.

The cycle of operations, wholly automatic, would be as follows: At the start the collector is full of water. The circulation valve to the penstock is opened and the fingerlings are drawn through the risers into the collector. When the operation has been continued long enough, the shutoff valve between the risers and the collector is closed. A small drain valve then is opened to draw down the accumulated water in the collector until it is possible to open the flushing valve directly into a flume crossing the face of the dam, which in turn discharges into the fish ladder. At the end of the discharge operation the flush and refill valve is opened, the drain valve is closed and any trash accumulation can be flushed out.

To prepare the collector for a new cycle the flushing valve to the discharge flume is closed and the chamber is filled to full height by flow through the refill valve. This valve then is closed, the intake valve from the risers is opened and the penstock valve is opened to start the new cycle.

Collapsible Rubber Drums to Save Shipping Space

A NEW 55-gallon drum made of synthetic rubber-fabric appears on the industrial scene. It is suitable for shipping liquids, it can be collapsed after emptying, it is returnable and reusable. Limited quantities are already being produced for essential uses in the petroleum and liquid chemical fields.

The new drum should effect sizable savings in return shipping cases, since more than 2,500 collapsed drums can be shipped in a standard railroad box car that would hold only 300 rigid drums.

Experimental tests indicate that the new drum will be suitable for the shipment of oils, greases, fats, acids, paints, emulsions, soaps, dry powders and a variety of pharmaceutical and industrial chemicals. It is also believed to be practical for transporting liquids by air for the military and for dropping liquids by parachute to ground troops.

It is made of Ustex cord fabric, impregnated with synthetic rubber and molded in one piece. (Ustex cord is a strong, low stretch cotton textile made by U. S. Rubber Co.) The result is a tough, flexible, synthetic rubber-fabric drum approximating the size of a regular barrel or drum. It is equipped with simple yet effective fittings for filling, emptying, lifting, and handling.

The drum is the result of nearly three years' development and testing work by U. S. Rubber Company. It is said to be tough, light in weight, easy to lift, roll, handle and stow. It is made of material that is non-corrosive, non-absorbent and highly resistant to weathering. It is easy to fill, empty and clean and needs no venting.

When full, it retains its shape without appreciable distortion. When empty, it can easily be further collapsed for return shipment and re-use. An empty 55-gallon synthetic rubber-fabric drum weighs less than 30 pounds.

The new type drum is considered to have safety advantages, since it needs no venting while being filled or emptied, and therefore can eliminate hazards sometimes encountered in handling certain acids and liquid combustibles. Liquids that oxidize easily can be withheld from exposure to air during re-

moval from the synthetic rubber-fabric drum. Since inner surfaces have no corner pockets, liquid contents can be completely removed and the inside quickly cleaned.

TOP—The drums, collapsed after emptying, are returnable, reusable.

CENTER—Drum collapses as liquid is withdrawn. No vents are needed.

BOTTOM—Because of rounded corners, the drums are easily handled.



Trends in Western Home Construction

CONSTRUCTION characteristics of single family dwellings in the West are reported in a study by the U. S. Bureau of Labor Statistics. Max D. Kosoris, Western regional director at San Francisco of BLS, reports that in the San Francisco-Oakland area the floor space averages 1,020 square feet, in Seattle 950, in Los Angeles 920 and Denver 860.

Percentages of other characteristics in the new homes being built are shown as follows:

	Los Angeles %	San Francisco-Oakland %	Seattle %	Denver %
Wood facing	—	28	70	25
Stucco facing	94	69	—	—
Steel sash windows	19	30	26	50
Gypsum wallboard	—	80	50	50
Plaster	50	—	—	—
Central heating	—	33½	50	75
Floor furnaces	95	66½	52	20
Fireplaces	16	69	40	10
More than one bathroom	5	5	10	10
Community sewage system available ..	75	100*	60	100*

* Nearly.

Wood facing seems to be growing in popularity; in custom-built homes, where the owner has a greater opportunity to make independent choice of materials, it was preferred in two-thirds of the houses. Most of Denver's homes were faced with asbestos shingles, and the widespread use of asbestos along with wood frames

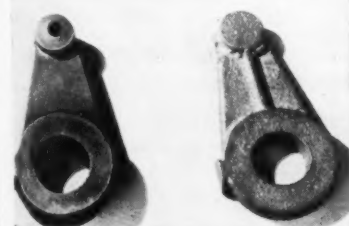
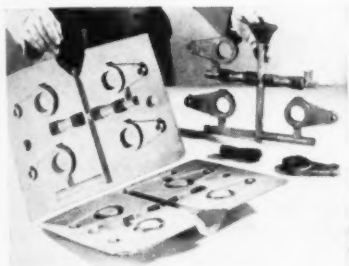
marks a departure from Denver's traditional brick and masonry. BLS attributes it to increase in home building in suburban areas, because in 1949 in Denver itself masonry residences accounted for more than half the one-family homes authorized.

Seattle showed a significant use of aluminum sash, amounting to 5%, with indications of sharp increase in the last year. Small builders are still important in Seattle and Denver. Homes built by owners or under contracts let by the prospective occupant made up 25% of the total in Seattle and 19% in Denver, but only 5% in Los Angeles and San Francisco.

Bakelite-Sand Molds Save Machining Time

FROM 30% to 40% of the normal machining time is saved on actual production of Meehanite metal machine parts cast by the new Croning Process.

This process employs thin, shell-like single-use molds made of sand bonded with Bakelite phenolic resins. The mixture of sand and resins is applied in a thin coating to the surface of a heated



metal pattern, then baked hard to form half of a mold. Clamped together, the two halves of a mold are placed in a flask, surrounded by steel shot or other suitable bedding material, and the metal is cast.

Smooth surfaces of the molds produce castings to tolerances of .002 to .003 of an inch per inch, drastically reducing the work necessary to finish the piece. One firm, a foundry, found that a connecting rod cast by the Croning Process (see cuts), processed in lots of 300, can be drilled, ground and cleaned in almost 30% less machining time than is required for a similar crank cast by ordinary sand mold methods (right side, bottom photo).

The use of Bakelite phenolic resins to make foundry molds and cores by the Croning Process saves metal and sand as well as time and space, increases productivity, produces more perfect castings with less rejections, and permits cleaner and safer working conditions.

CASTERS

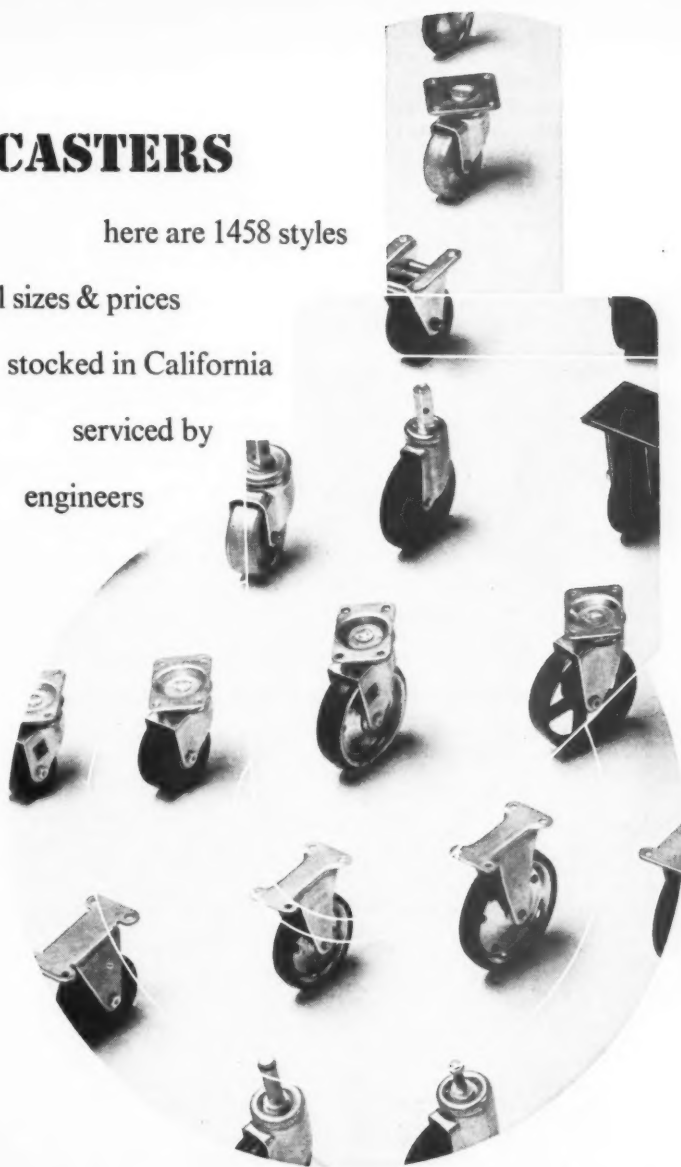
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Pneumatic Tube System Cuts Blueprint Costs

A WEST COAST manufacturer uses a 1½-mile-long pneumatic tube system to speed blueprints from the central blueprint station to outlying technical departments—engineering, experimental, machine shop, production, assembly, inspection, maintenance, and so on.

The system makes rapid deliveries at a speed of 20 to 25 ft. per sec., and minimizes inter-departmental manual handling of prints. It also cuts blueprint production costs at least 40%. Previously, as many as 15 copies of a given print would be required whereas now only two are needed—one "on call," the other "on reserve."

Designed and installed by the Lamson Corporation, Syracuse, N. Y., the system comprises a 3 x 12-in. pneumatic tube network reaching from the central blueprint station to six substations. When someone wants a print,



When print is wanted, central station is called and print is delivered within a matter of minutes.

he calls the central station. The desired print is placed in a container (see photo), sent by tube to the nearest substation and is picked up by, or delivered to, the caller. The reverse procedure is followed when returning prints.

"Yard Donkey" Switches and Spots Semi-Trailers Fast

A "YARD DONKEY," recently put into service at Pacific Intermountain Express Co. terminals, is earning its own keep. It is a single-seat tractor, 13 ft., 2 in. over-all, utilized to speed up switching or spotting of semi-trailers at terminal freight docks, and to tow semi-trailers undergoing regular inspections, servicing and cleaning in the mechanical washer at the general shops in Denver.

This "donkey" is equipped with a hydraulic fifth wheel controlled by the driver, from his seat. Such arrangement permits the yard hostler to back under a semi-trailer and, after the king-pin is locked, lift it up without having to crank up the "landing gear."

Landing gear under the semi-trailer is lowered when the road tractor is unhitched, to hold the trailer in a level position. By use of the hydraulic fifth wheel on the donkey, it is not necessary to raise and lower the landing gear in the yard. Design of the fifth wheel allows the wheel to raise the semi-trailer high enough for the landing gear wheels to clear the ground, as the trailer is being moved from one location to another.

From his seat on the pint-sized tractor, the hostler can also reach in back and connect or disconnect the air lines that carry air to the semi-trailer brakes. A special stand holds the lines at a convenient level just behind the driver's seat. Thus the hostler is able to perform the whole operation of backing a semi-trailer into the dock or pulling one out into position for over-the-road service without any lost motion or having to get down on the ground.

By making the air connection, brakes on the semi-trailers can be tested before hooking on to line haul power equipment. Having the air brakes operating on the semi-trailers also makes for

greater safety in the yard.

Short coupling permits mobility that could not be obtained by a standard tractor when used in the yard. This feature is particularly important in connection with the movement of semi-trailers in the maintenance and overhaul shops at Denver. With the donkey a 35-foot semi-trailer can be turned around in its own length or can be switched easily from one service line to another while undergoing inspection maintenance.

This design was developed by P-I-E engineers and fabricated under company specifications by Coleman Motors, Littleton, Colo. Bartlett Trailer Co. of Chicago, Ill., furnished the hydraulic fifth wheel. Power unit and component parts were supplied by Ford Motors. P-I-E, at the present time, has nine of the donkey units in operation. P-I-E's major Western terminals are at Los Angeles, Oakland, San Francisco, Salt Lake City, and Denver.



The system operates 24 hours a day and is powered by four turbo compressors, each operated by a 15-hp. electric motor. This provides a displacement capacity of 2,000 cu. ft. per min. and a 16 oz.-per-sq.-in. vacuum.

The company also maintains a 15,000-ft., 3-in. cylindrical tube system for intra-plant handling of messages, scheduling tickets, routing forms, small parts, small tools, etc.

Insert Prolongs Life of Screw Machine Carriage Slide

A NEW application of the Rosán Insert which prolongs the life of the carriage slide and greatly reduces the maintenance cost of Brown & Sharpe automatic screw machines has been revealed by the Pacific Screw Products Corp. of South Gate, Calif.

For some time Pacific engineers have been wrestling with the problem of eliminating needless expense in replacing the carriage slide whenever the tapped hole securing the turret locking-pin lever stud becomes stripped.

Recent tests, which consisted of re-tapping the hole and installing a Rosán Insert which restored the internal thread diameter to its original dimension, proved as satisfactory as the original fitting.

When the internal thread again becomes stripped, the insert is simply machined from position and replaced with a new insert.

Pacific Screw Products officials predict that this application will save the company thousands of dollars.

Source Determined of Vegetable-damaging Smog

CROPS in which the salable portion consists mainly of foliage, such as lettuce, spinach and alfalfa, sustains most damage from smog. This is established by tests conducted at Earhart Plant Research Laboratory, California Institute of Technology.

Major among smog components responsible for this damage are unsaturated hydrocarbons, produced primarily by petroleum fumes. Through evaporation, these vapors escape into air and combine with ozone or oxides of nitrogen.

Products of this oxidization, in addition to certain other gases, enter plants, causing dehydration and scorching of leaves. Although petroleum companies endeavor to control amount of fumes from their operations, oil fields and refineries continue to be most concentrated sources of these damaging hydrocarbons, according to C.I.T.

Bethlehem Ups Capacity To 839,000 Tons Annually

BY THE END of 1952, over a six-year period, Bethlehem Pacific Coast Steel Corp. will have increased its steelmaking capacity in its three West Coast steel plants located in Seattle, South San Francisco and Los Angeles by 50% to a total of 839,000 net tons of ingots annually. The steelmaking capacity of its two California plants during this period will be increased by 77% to a total of 624,000 net tons.

Details of the Coast expansion program are as follows:

Los Angeles Plant

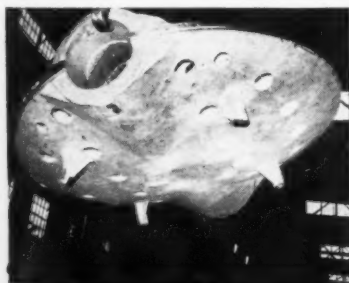
1. Bethlehem's largest electric furnace, 75 tons capacity, was put into operation last year.
2. Another electric furnace of the same size has been authorized at this plant as a part of the present expansion program.
3. This plant's 12-inch bar mill has been completely modernized.
4. New cold bolt manufacturing equipment.

South San Francisco Plant

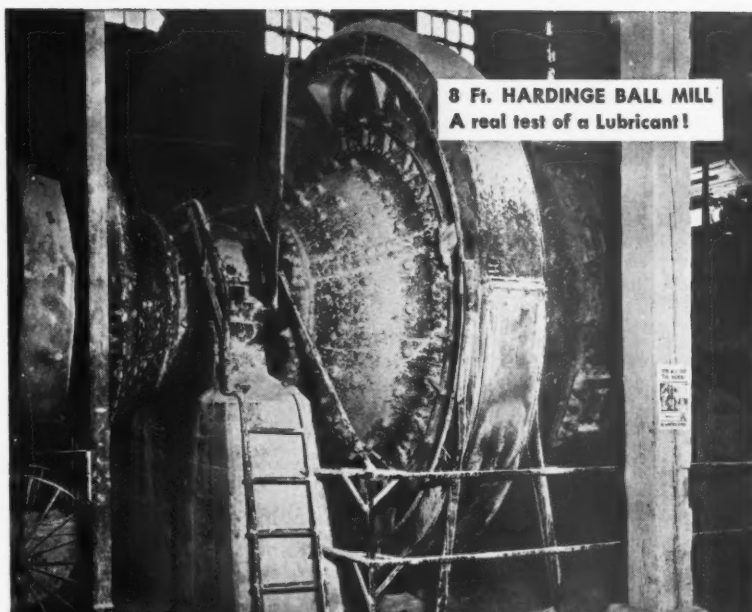
1. Expansion of plant facilities at transmission tower shop.
2. Enlargement of furnaces and installation of heavier ladle cranes in open hearth department.
3. Erection of only transmission tower testing frame in West for testing new designs.

Seattle Plant

1. Completion of a new fabricating works, largest in the Northwest, took place last year at this plant.



THIS IS NOT A FLYING SAUCER. It is a 27,000-lb., 120-in., bronze-rimmed cast-steel leaf for a butterfly valve being manufactured in the Sunnyvale, Calif., plant of Westinghouse Electric Corp. This valve is designed to control the flow of water through a penstock leading to a big waterwheel generator in a southern California hydroelectric power generating station. Holes shown are on the downstream face of the leaf. The upstream side is solid cast steel. Those "legs" you see are steel supports temporarily welded to the leaf, to speed machining and other manufacturing operations.



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"Lubriplate Lubricants enabled us to cut the number of lubricants we were using to about half, but even then we were still using five different LUBRIPLATE Products. With the introduction of LUBRIPLATE No. 630-AA, we were able to reduce our requirements still further. Today we are satisfying all our needs for solid type lubricants with only two LUBRIPLATE Products. LUBRIPLATE No. 630-AA might almost be considered a Universal Lubricant. Furthermore, LUBRIPLATE No. 630-AA has effected a marked savings in lubricants and labor."

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General Superintendent



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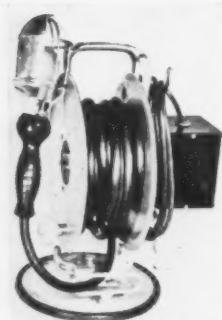
NEW MATERIALS & EQUIPMENT

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Use postage-paid card following page 82 to obtain further information on products described on these pages and literature listed on following pages . . .

E-501

Low Volt Lamp Lessens Shock Fatalities



Features claimed: Damp and wet work sites are perfect conductors for electrical current, and when workers use high-voltage lamps in such areas the danger is great. The Etraco Saf-T-Lite, a low-voltage lamp, reduces this danger. A new model, the Etraco Reel-Lite can be used at greater distances from the electrical source. It is available in several different sizes with extension cords of 50 to 100 ft.

Available from: Etraco Manufacturing Co.

E-502

New Device Compiles, Plots Automatically

Features claimed: Automatic compiling of two measurements and plotting of a curve to show their interrelationship, namely: Y equals $f(X)$, is made possible by the Brown ElectroniK function plotter. This instrument incorporates two measuring systems, one of which actuates recorder pen while the other motivates instrument chart.

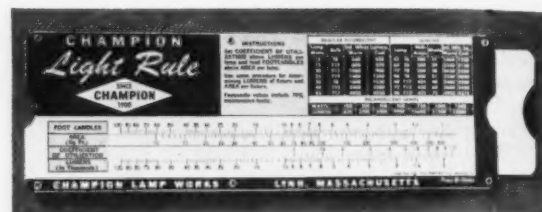
With this arrangement chart is driven up and down in response to changes in one variable simultaneously with movement of pen in response to changes in a second variable. Result is a curve which continuously evaluates one variable in terms of the other. Measurements over entire curve are continuous; no interpolation is needed to complete data between points of measurement.

Available from: Minneapolis-Honeywell Regulator Co., Brown Instruments Div.

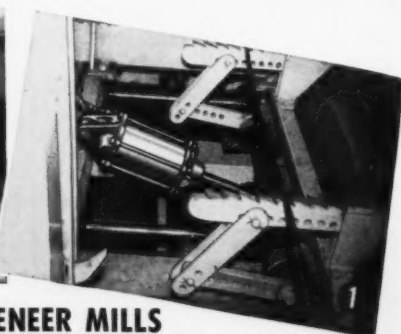
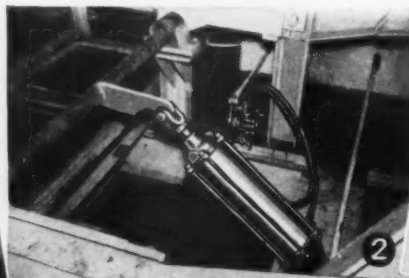
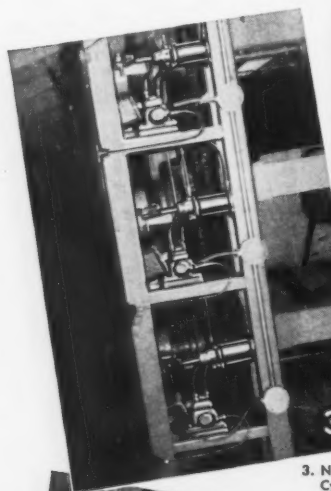
E-503

Handy Aid to Figure Lighting Problems

Features claimed: An extra right-hand in slide-rule form that helps you in speedy and accurate calculation of gen-



eral lighting problems. Simple to work. All necessary instructions are printed on the envelope the rule comes in. All you need to do is to take the known quantities, locate



1. Cant Flipper actuated by NOPAK Model "E" Cylinder.
2. Log Deck Flipper-Arm Set-Up operated by 6" x 18" Model "E" Cylinder controlled by NOPAK Model "R" Foot Valve.

3. NOPAK 3" x 3" Model "E" Cylinders, controlled by Model "F" Solenoid Valves, actuate clutches on Veneer Trays.



4. Saw Carriage equipped with 4" x 12" and 8" x 10" NOPAK Cylinders.

LUMBER and VENEER MILLS Find Many Uses for NOPAK Valves and Cylinders

The four applications pictured here are typical of hundreds now in operation in the lumber and wood products industries. Lifting, tilting, pushing, pulling and clamping operations are readily simplified and accelerated through proper application of NOPAK Valves and Cylinders of the correct size and type.

In modernizing machines or equipment which you use in your own plant, or build for others, consider the advantages of using Air or Hydraulic Power the NOPAK way. For data and descriptions, refer to Sweet's File for Product Designers, or write for Bulletin SW-1.

GALLAND-HENNING MFG. CO., 2749 S. 31st Street, Milwaukee 46, Wis.

Representatives
in Principal
Cities

NOPAK
VALVES AND CYLINDERS
DESIGNED for AIR and HYDRAULIC SERVICE
A 5913-1/2 H-A

them on this "lightrule," and then read the answers you want to know.

Available from: Champion Lamp Works.

E-504

Midget Liquid Blast Cleaner



Features claimed: This midget unit liquid blast cleaner weighs in at only 40 lbs. (where aluminum can be used for the main housing) and will operate from either a 1/4-in. compressed air line or any bottle of compressed gas. It boasts a blast chamber 15 in. in diameter, which makes blast cleaning methods available for the small operator, and provides larger operators with an excellent portable tool for special projects. Ideal for die and mold

polishing after heat treatment, precision part polishing, surface treatment to hold light lubricating oil films and preparation for plating.

Available from: Pangborn Corporation.

E-505

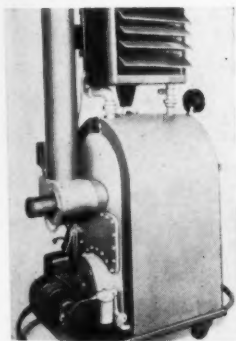
Rubber Molds Cleaned Quickly

Features claimed: D-Scale-R is an inhibited acid cleaner which can be safely used on metals. When molds are dipped in a solution of the substance in a stainless steel tank, at about 140 deg. F., left about 2 minutes, then rinsed, they are ready for use. Low cost of the operation and no downtime for periodic cleaning are advantages. The process is used with great success by a maker of rubber footwear.

Available from: Magnus Chemical Company.

E-506

Portable Steam Space Heater



Features claimed: Fully automatic, oil fired and portable, this steam space heater is suitable for heating large confined spaces. It gives a clean, safe heat for spaces where under other conditions a danger of carbon monoxide might exist. It is equipped with Catomic Adjustable Turbulators to give perfect combustion, and it burns only one and a half gallons of number two fuel oil per hour. Its large tank holds thirty gallons. It is fully equipped with a thermostat on the extension

cord, mounted on rubber-tired casters for easy mobility, and operates from any electrical outlet with 110 volts.

Available from: Quiet Automatic Oil Burner Corporation.

E-507

Metal Substitute

Features claimed: A laminated strip product, consisting of a solid sheet of silver (not an electroplating), clad on either of both sides of a core of mild steel, is now available in widths up to 4" in thicknesses down to .005", and in any required temper. It is manufactured in various silver-

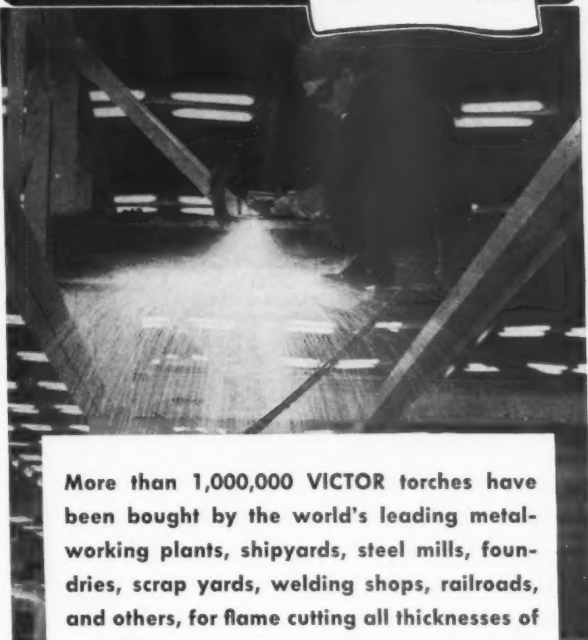
OVER

1,000,000 CUTTING TORCHES

Demonstrate

IT COSTS LESS TO OWN AND OPERATE

VICTOR



More than 1,000,000 VICTOR torches have been bought by the world's leading metal-working plants, shipyards, steel mills, foundries, scrap yards, welding shops, railroads, and others, for flame cutting all thicknesses of metal from light sheet to armor plate. Here's why so many prefer VICTOR cutting torches:

4 DIFFERENT VALVE LEVER POSITIONS

Operator can choose position that "feels" right to him.

CHOICE OF 90°, 75°, 45°, OR STRAIGHT

HEAD—all interchangeable, so you can quickly change from one to another as work requires.

DIFFERENT TIP STYLES—each in several sizes, so

you may select the right tip to get maximum cutting speed and gas economy on your job for every application.

VICTOR

Welding and Cutting Equipment
Since 1910

Standardize NOW on Victor for cutting and welding—it will cost you less. Ask your Victor dealer to show you.

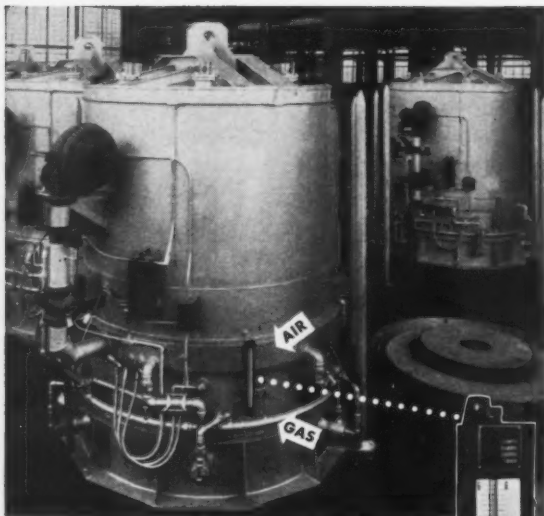
VICTOR EQUIPMENT COMPANY

3821 Santa Fe Ave.
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SAN FRANCISCO 7

1312 W. Lake St.
CHICAGO 7

May, 1951 — WESTERN INDUSTRY



Coil annealing furnaces and bases supplied by the Lee Wilson Engineering Co., Inc. of Cleveland, Ohio. Equipped with Meriam Well Type Manometers.

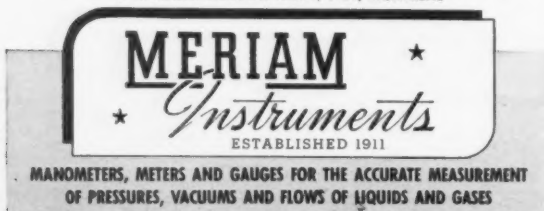
Air-Gas Pressure Ratio Quickly Determined with...



A manometer is connected with both the gas pipe and the air channel which encircle the furnace. Pet cocks in the connecting lines permit shutoff so that the operator can read gas pressure and air pressure alternately—and thus quickly determine the air-gas header pressure ratio.

This Meriam Well Type Manometer is *direct reading*. Saves time—no additions—prevents errors. The instrument is remarkably simple, yet thoroughly sensitive and accurate in its readings. Meriam Manometers are widely used in industrial plants and laboratories for measuring pressures and vacuums of practically all kinds of liquids and gases. Send for complete information.

THE MERIAM INSTRUMENT CO.
10988 MADISON AVENUE • CLEVELAND 2, OHIO
WESTERN DIVISION: 4760 E. OLYMPIC BLVD., LOS ANGELES 22, CALIF.
IN CANADA: PEACOCK BROS., LTD., MONTREAL



to-steel thickness ratios, rolled and slit to commercial or precision tolerances. Its high lustre requires little polishing. This strip is used in place of brass, nickel-silver, nickel, and other restricted materials, subject to N.P.A. order M-47. It is shaped by any conventional metal-working process.

Available from: Rolled Plate Division, American Silver Company, Inc.

E-508

Soldering Torches

Features claimed: Model 78SC is for heavy-duty use; Model 76SC is for medium duty. Both are designed to operate on L-P gas, but can be ordered with different size



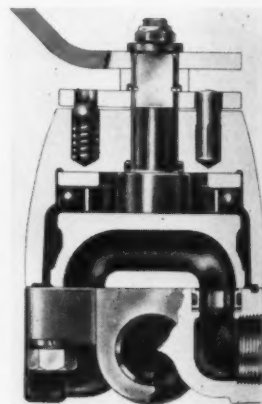
orifice for use with natural gas. The copper heads are interchangeable, so you can buy one torch and two heads—thus being able to handle both heavy and medium work with one unit. Heads contain no zinc; consequently they do not pit when used at high temperatures. They heat to working temperatures in 2 to 3 minutes. Flame is controlled by a needle valve. Both torches are 15" long. Model 76SC weighs 1 lb., 6 oz., and is equivalent to a 2-lb. copper soldering iron. Model 78SC weighs 1 lb., 10 oz., and is equivalent to a 5-lb. copper iron.

Available from: Bill Ransome Co.

E-509

Extreme Pressure Hydraulic Valve Design

Features claimed: A pressure balanced, self-aligning tubular valve seat keeps perfect intimate contact with the mating surface of an optically flat porting disc. Rotary movement of this disc (or rotor) opens and closes the flow passages. During absence of fluid pressure a heavy marcel spring-washer maintains contact between sealing surfaces, while a predetermined hydraulic force acts on the seal under extreme pressure. Production models cover a complete range of the following types and pressures: Shut-off valves from $\frac{1}{4}$ " to $1\frac{1}{2}$ " for pressures from 0 to 6,000 psi.; 4-way selector valves from $\frac{1}{4}$ " to $1\frac{1}{2}$ ", same pressures; 4-way dual pressure valves in two classes:



(a) 3,000 psi. max.; (b) 6,000 psi. max.; manipulator valves from $\frac{3}{8}$ " to 1" from 0 psi. to 1,500. Service ratings include all common industrial media such as water, air, hydraulic oil, gas, fuel, and petroleum.

Available from: Barksdale Valves.

E-510

Honeycombed Plastic Floats and Insulates

Features claimed: Expanded Royalite is honeycombed with millions of tiny non-connecting cells which make it extremely light. It is strong, not affected by sun or salt water and will stay afloat indefinitely. Applied to life ring buoys, life rafts and other such flotation equipment, the material is superior. Royalite is also an excellent thermal

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polishing.
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r M-47.
rocess.
n Silver

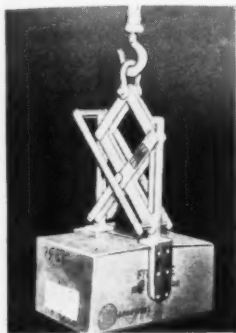
insulator, especially where insulating material for structural strength is desired. Because the material has no moisture absorption, its thermal insulating properties remain excellent for many years. Its weather resistance makes it suitable for giving consistent and uniform operation to any equipment it may house.

Available from: United States Rubber Company.

E-511

New Automatic Lock Cuts Materials Handling Time

Features claimed: A new automatic locking arm makes it unnecessary to "reset" this claw after each loading. Its tong type grabs do not collapse after load is discharged, but remain open until placed over next load, thereby minimizing adjusting and positioning time. Claw has scissor-action which insures greater holding power as load increases, and parallel gripping surfaces that protect cartons and boxes from damage in handling.



Available from: Cleveland Beacon Products Co.

E-512

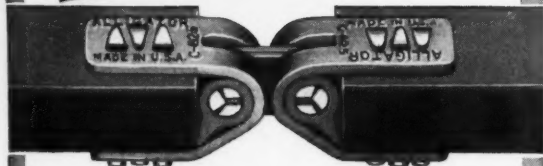
Tin Saver

Features claimed: This new testing instrument measures X-rays reflected from steel sheets to determine thickness of tin coatings, so that no tin is lost in testing. Machine con-

-aligning
with the
Rotary

Now you can fasten V-belts by using

ALLIGATOR
V-BELT FASTENERS



● Alligator V-Belt Fasteners and open-end (long length) V-belt in rolls will enable you to make up multiple V-belt drives for a wide variety of applications.

Available for B, C and D sizes of V-belt. Not to be used for repairing endless cord V-belts. Bulletin V-211 will give you complete details. A copy mailed on request.

Order from your supply house

FLEXIBLE STEEL LACING COMPANY
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Also sole manufacturers of Alligator Steel Belt Lacing for flat conveyor and transmission belts and FLEXCO Belt Fasteners and Rip Plates for fastening and repairing conveyor belts.

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May, 1951

May, 1951 — WESTERN INDUSTRY

You can't jam the new RIGID 65R

Really streamlined
pipe threading with this
RIGID self-contained
die stock



Right Here is the simple device that makes 65R automatically JAM-PROOF.

● You don't have to watch it—lead screw can't jam on workholder. New jam-proof drive plate automatically kicks out driving ratchet pawl when standard length thread is cut. Your recent model 65R easily converted—just buy new drive plate, put in place of old plate. Perfect threads on 1" to 2" pipe with one set of 4 high-speed steel dies—sets to pipe size in 10 seconds, mistake-proof self-centering workholder sets instantly! Buy the new jam-proof RIGID 65R at your Supply House.

RIGID

★ Work-Saver Pipe Tools ★

THE RIGID TOOL CO., CLEVELAND, OHIO



**"We're running low on letterheads,
On paper clips and pencil leads."**



**"For printers and for stationers
Shop 'Classified', when this occurs."**

For office supplies, furniture, typewriters... for services such as printing, accounting, look first in the Yellow Pages. When you need any product or service... find it fast in the Yellow Pages. Just as other buyers will find you fast when you advertise in Classified.

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YELLOW PAGES
of your Telephone Directory



Pacific Telephone

sists of 2 X-ray tubes, one mounted above test sheet and other below. Strength of reflected X-ray beams from sheet are measured by Geiger counters and count is recorded on a paper tape. Recorded readings are calculated into amount of tin on test sheet.

Available from: U. S. Steel Corporation.

E-513

Free Wheeling Fluid Tractor

Features claimed: Freewheeling has been built into this fluid tractor. This consists of a magnetically-operated clutch which engages drive wheel when power is on, and disengages, allowing tractor to roll freely, when power is



off. Thus a tractor-propelled load can be quickly hand spotted without "jogging," and on mating conveyor lines, tractor with sub-assembly can freely follow movement of main conveyor line. Clutch is precision built and operates on ball-clutch principle. Tractor is available with $\frac{1}{2}$ or $\frac{3}{4}$ hp., 3-phase electric motor operating at 1750 rpm.; fits any track with flat or tapered thread from 2 inches minimum to $6\frac{1}{4}$ " maximum. Tractor

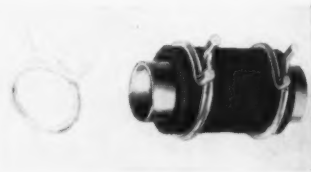
moves loads up to 5 tons, and is totally enclosed in dust-proof aluminum alloy housing.

Available from: Calabar Corporation.

E-514

Hose Clamps Easy to Install

Features claimed: This self-tightening hose clamp has spring tension which makes it self-adjusting to temperature changes. Installation consists of squeezing ends of ring-type clamp with pliers, slipping clamp over connection and releasing. Clamp exerts uniform pressure at every circumference point, allowing for irregularities in hose or pipe up to $1/16$ ". It is shaped of rounded stock to prevent cutting the hose. These clamps are made in sizes to fit connections



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from $\frac{3}{8}$ " O.D. through $2\frac{5}{8}$ " O.D., and can be used with rubber, fabric or plastic hose, conveying air, gases or liquids.

Available from: Corbin Hose Clamp Division, American Hardware Corp.

E-515

Lanco Lift Jack

Features claimed: This lift jack materials handling system lifts 3,000 pounds of distributed weight with only a slight handle pressure by operator, and with no danger of kickbacks or slipping. Jack is used with any number of wheeled skid platforms which can be attached from any angle at front of platforms. Platforms are constructed of heavy angle-iron with hardwood decks, and are stored in a very small space when not in use. Standard or custom made racks for plat-



forms are available.

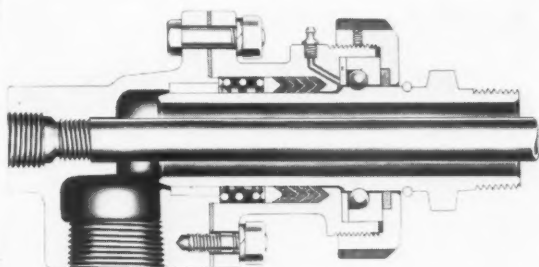
Available from: Lansing Company.

E-516

Revolving Joint for Piping Connections

Features claimed: This compact and improved revolving joint is designed for use in making piping connections to drum type driers, rolls, calendars, and other rotating

equipment. Type IBR joint offers extremely low torque for substantial power savings. Models are available for handling steam, oil, air, water, gas and chemicals. Rotating portion of the joint consists of a special precision machined



and heat treated steel tube which screws into the hub of the drum or roll. The non-rotating portion of the joint is ball bearing mounted on this tube.

Available from: Barco Manufacturing Co.

E-517

No Need for Rust in Batch Production

Features claimed: This method of rust prevention in batch production of machinery and contractors' plant combines de-rusting with establishment of a first-class surface suitable for painting or other treatment. This Jenolizing process is particularly suited to batch production since it is designed to protect metal surfaces from rusting for a long period under arduous conditions. A single dip is all that is required to remove rust which may have formed in

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50' x 120' Rigid Frame Building built for Aircraft Stamping Co., Alhambra, Calif.

Steel Structures designed and built to fit your special requirements: Industrial; Shop; Maintenance; Warehouses; Pump and Compressor Houses as well as Loading Docks; Canopies; and Garages.

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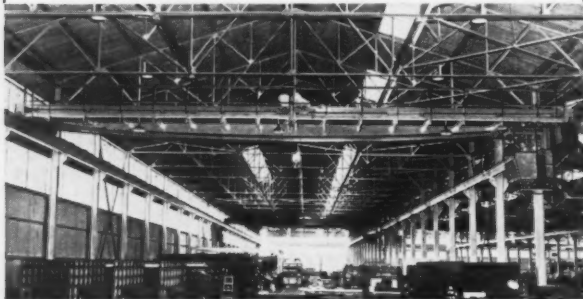


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CALIFORNIA CORNICE, STEEL & SUPPLY
CORPORATION

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**Another
SHEPARD NILES
OVERHEAD CRANE
Installation by
CRANE HOIST ENGINEERING CORP.**



**IN ONE OF LOS ANGELES'
LARGEST STEEL WAREHOUSES**

This heavy duty, high speed overhead crane, designed and fabricated locally by the Crane Hoist Engineering Corp., was custom-built to the exact requirements of the job with full magnetic control, Timken bearing alloy steel wheels, and Shepard Niles crane trolley and component parts.

**YEARS OF SERVICE
BUILT IN**

It is an addition to six existing cranes of the same make and type currently in use on adjacent runways in the same warehouse. These cranes range in age from one to thirteen years. This evidence of customer satisfaction is the finest testimonial we know of to our ability to build a crane to do your particular job. If you have an overhead handling problem, and want the most crane for your money with satisfaction built in, a CHECO engineer will be glad to work with you.

CRANE HOIST ENGINEERING CORP.

**DESIGNERS • FABRICATORS • ERECTORS
OVERHEAD TRAVELING CRANES**

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**Exclusive Southwestern Distributors
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SHEPARD NILES CRANE & HOIST CORP.

**6238 Maywood Avenue, Bell, Calif.
LOGan 5-6255**

Full stock of replacement parts

storage, as well as to rust-proof and key metal surface for paint adhesion.

Available from: Jenolite Distributing Co.

E-518

Lift Larger Loads Safely

Features claimed: A load-centering feature on this eye-bolt makes it capable of lifting loads that are 10 times heavier than those possible with conventional eye bolts. The eye pivots, permitting weight to center. Eye-bolts are made of high grade steel, are light in weight and precisely balanced. Bolts are replaceable. Standard models are available in bolt sizes of $\frac{1}{2}$ ", $\frac{3}{8}$ ", $\frac{3}{4}$ ", $\frac{7}{8}$ " and 1", USS threads. Special sizes and SAE threads also are made to order.

Available from: Robert H. Froom & Co.



E-519

Cylinders Offer More Lifting Power



Features claimed: The 20-in. diameter model air cylinder produces over 30 tons of lifting power at rated operating pressure of 200 psi. It is particularly adaptable for use on presses and other heavy production machinery. It is also available in 8 to 18-in. bores. These large diameter cylinders can muster lifting powers of 195 tons. Like their smaller models, they have non-breakable solid steel heads, caps and mountings, hard chrome plated piston rods and self-regulat-

ing seals that never require adjustment.

Available from: Miller Motor Company.

E-520

Put Out Fires

Features claimed: This new one gallon vaporizing liquid fire extinguisher consists of big dual air pumps which build up internal air pressure which instantly forces liquid out

28 Years of Successful use in treating burns!

KEEP KIP HANDY

Easy spreading antiseptic ointment. Packed in tubes and tins. In liquid form, too—Kip Antiseptic Oil (with benzocaine).

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The 20-
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tons of
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May, 1951

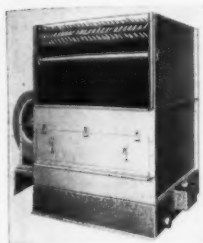
in a continuous, steady stream up to 30 feet. This light weight extinguisher offers highly effective protection against electrical and flammable liquid fires. Vaporising liquid contained in extinguisher is non-freezing and contains a remarkable drying agent which prevents internal corrosion. Unit is sealed in an air-tight compartment.

Available from: Buffalo Fire Appliance Corp.

E-521

Dry-Fan Cooling Towers

Features claimed: These towers, of the blower type, are manufactured in two models. The 2-B Series is available in 9 sizes, with capacities ranging from 3 to 30 tons.



Air enters these cooling towers through a squirrel cage type fan at the bottom of the tower and is exhausted through the redwood drift at the top. Series 2-BB is equipped with 2 double-inlet squirrel cage blowers. These towers are made in four sizes with capacities ranging from 32 to 60 tons of refrigeration. Both models are equipped with clog-proof nozzles which

assure fine fluid break-up for maximum heat transfer.

Available from: Binks Manufacturing Company.

E-522

Perfectly Square Edges

Features claimed: Square-Ezy, a device for planing square edges, consists of a clamp with a free-turning cylindrical sleeve which extends below base of plane. Sleeve



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FLOOR
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FLOOR
"Power Helper"**

**More Efficient Than an Elevator . . .
Cost \$3,044 LESS!**

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Give height, floor
to floor and
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available—
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METZGAR CO.

402 DOUGLAS N. W.

GRAND RAPIDS 4, MICH.



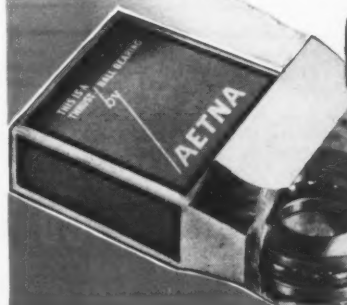
When you stop to think of it there are two opposed objectives in almost every designing job: product improvement with little or no increase in cost. It's a tough assignment that leaves only pennies and ingenuity to work with.

In striving to fill this difficult order, it's always profitable to remember that quality Aetna bearings do for a machine what salt and pepper does for a meal—CONTRIBUTE MORE TOWARD ITS SUCCESS, AT LESS COST, THAN MOST ANY OTHER FACTOR.

That's why engineers are rapidly turning to Aetna bearings as an easy, low-cost approach to substantial product improvement. Chances are, you too can benefit by letting Aetna engineers institute a "search for savings" analysis of your present products or those in the blue-print stage. You'll find their work painstaking and practical with one thought in mind—betterment of your products within your manufacturing cost limitations.

Tomorrow's unpredictable conditions demand that today's new machines be, dollar-for-dollar, the most efficient, most durable ever made. And . . . Aetna stands ready to help you in that endeavor.

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acts as a fence and keeps plane at a perfect right angle to side of board being planed. There is a hardwood knob on side for putting sideward and downward pressure on plane. Square-Ezy can be used on right or left side of any plane. A uniform bevel is obtained by adjusting angle of plane's blades.

Available from: Bratton Company.

E-523

Rocket "51" Chain Hoist

Features claimed: This light-weight chain hoist features a V-belt driven cam-actuated gear mechanism with a $10\frac{1}{2}$ to 1 ratio that develops a hoisting efficiency of 95.6%. Power is transmitted to load wheel with less frictional loss than in a gear assembly and at a saving in cost. Weight is 79 pounds, headroom 14 inches. Current models are built in 500-lb. and 1,000-lb. capacities and powered by high-torque 220/440 v., 3-phase, 60-cycle motors. Conventional coil type chain is employed.

Available from: David Round & Son.



E-524

Electronic Accessory for Paint Spraying

Features claimed: "Paint-Miser" operates on electrostatic attraction principle which precipitates up to 95% of paint spray on work, greatly reducing overspray and cutting paint waste to a minimum. This is accomplished by establishing a negative charge in paint particles after they

leave spray gun. Negatively charged spray is attracted to item to be coated which is at ground potential. This portable unit is contained in a metal console cabinet with control panel mounted on top at convenient operating angle.

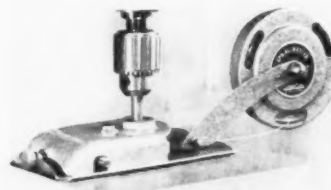
Available from: Ashdee Products, Inc.

E-525

Have a Spring Factory of Your Own

Features claimed: It is possible for you to convert your tool shop drillpress into an efficient spring-making machine with this "Spring-Master." Wire from 8 ga. (.020) to 28

ga. (.0071) can be used. Outside diameter of finished springs can vary from $\frac{3}{16}$ " to $\frac{5}{8}$ ". Special dimensions are made by special spindles. Pitch of compression springs may be infinitely varied while machine



is running. Length of spring to be made is governed only by length of wire.

Available from: Cycloid Corp.

E-526

Mending Magnesium

Features claimed: This magnesium rod, which not only gives the same strength and corrosion resistant properties of the base metal, but also melts well below melting point of casting, is ideal for filling holes in magnesium castings, building up, or repairing cracks and general salvage, repair



Greater Safety with

GOODSEAL INDUSTRIAL GLOVES

SURE PROTECTION FOR BUSY HANDS. Goodall's safe, comfortable, puncture-resisting Goodseal Gloves are extra tough with greater resistance to acids, oils, chemicals, degreasing solutions, solvents, abrasion, etc. Goodall Goodseal Gloves last longer . . . serve every industrial need . . . and give workers added assurance when working in dangerous fluids. ORDER GOODSEAL ALL-PURPOSE RUBBER GLOVES TODAY OR WRITE FOR FOLDER.

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OTHER GOODALL PRODUCTS


For full protection, order Goodall's finest quality rubber aprons and waterproof footwear.

Waterproof Clothing • All Types Rubber Hose • Belting and Packing.

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is port-
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g angle.

and maintenance work on cast magnesium. Can be applied by torch brazing with No. 61 Brazaloy Flux; has working temperature of 1090° F., and is exceptionally free flowing.
Available from: All-State Welding Alloys Co., Inc.

E-527

Roto-Cone Variable Speed Pulley



Features claimed: Providing variable speed changes in 15 hp. range, this 3-to-1 ratio Roto-Cone variable pitch pulley, Model 1300-150, is dynamically and statically balanced and uses a standard vari-speed rubber V-belt. Roto-Cone rack and gear arrangement positively controls sheave movement and assures perfect belt alignment throughout entire speed range, resulting in longer belt

life and smooth, vibrationless drive.

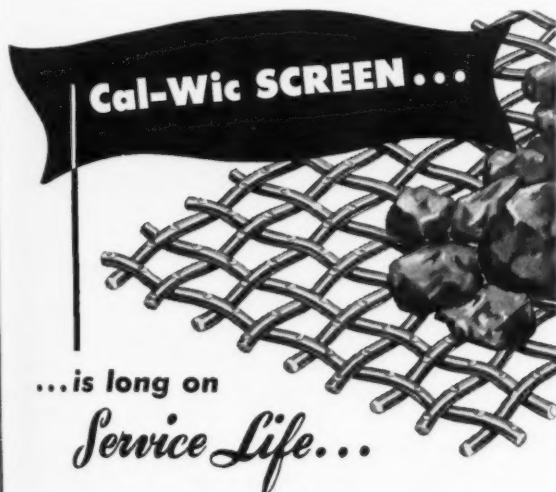
Available from: Gerbing Mfg. Co.

E-528

Synchronous-Motor Timer

Features claimed: This type SY "Promatic timer can be used for all time periods between 1/2 second and 24 hours. It actuates five s.p.d.t. load contacts, independent of timer-control circuits. There are two separate solenoids, one operates clutch and timing mechanism, the other actuates load contacts. Timer automatically resets for each new cycle. It is mounted on a cast frame, and has "O" ring-

not only
properties
ing point
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ge, repair



Cal-Wic screens are made of special steel to withstand abrasion. Precision woven on looms built for just this service, Cal-Wic screens won't loosen up or shake apart. For efficient, economical trommel or vibrating screen, buy Cal-Wic screens made to fit your equipment.

The California Wire Cloth Corp.
OAKLAND

A Product of

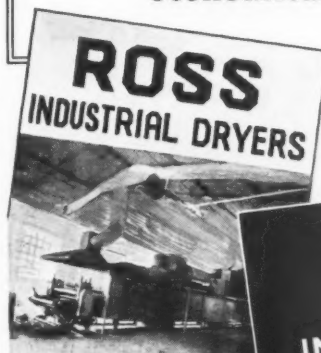


CAL-WIC PRECISION SCREEN

**Pointing the way
to faster and more
economical production**

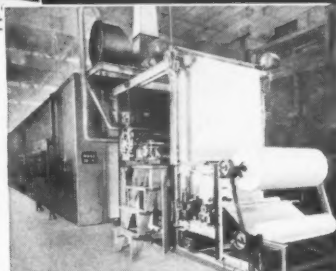
**ROSS
INDUSTRIAL DRYERS**

Write
for these
Bulletins



J. O. ROSS ENGINEERING CORPORATION
Bakersfield, Calif. - Santa Barbara, Calif. - Los Angeles, Calif.

**ROSS
INDUSTRIAL
OVENS**



Get the benefit of 30 years of experience with drying and baking problems

In the processing of essential products and materials—whether for the defense effort or the civilian economy—the need is for a "speed-up" in production, greater uniformity of finished product and a sizable saving of time, labor and fuel. For three decades—including the period of World War II—leading manufacturers in practically every major industry have installed ROSS ENGINEERED equipment to accomplish all these objectives.

The two bulletins, pictured above, will give you complete information, description and pictures, on the wide variety of processing operations that are improved with ROSS apparatus for heating, drying, baking, curing, treating, aging, conditioning. Copies will be sent promptly on request and without obligation. Investigate the possibilities for your product—present or planned.

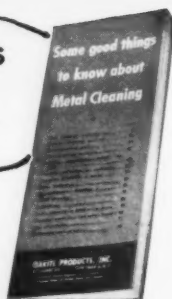
**J. O. ROSS ENGINEERING
CORPORATION**

DESIGNERS AND BUILDERS OF AIR PROCESSING SYSTEMS

444 Madison Avenue.....New York 22, N. Y.
600 St. Paul Avenue.....Los Angeles 17, Calif.

**WHICH SOILS
ARE HARDEST
TO REMOVE?**

- | | |
|------------------------------------------------------|-------------------------------------------|
| <input type="checkbox"/> buffing compound residues | <input type="checkbox"/> tarnish |
| <input type="checkbox"/> pigmented drawing compounds | <input type="checkbox"/> flux residues |
| <input type="checkbox"/> oils and greases | <input type="checkbox"/> rust preventives |
| <input type="checkbox"/> heat scale | |
| <input type="checkbox"/> rust, oxides | |
| <input type="checkbox"/> carbon smuts | |



Technical Service Representatives in
Principal Cities of U. S. & Canada

OAKITE
SPECIALIZED INDUSTRIAL CLEANING
MATERIALS • METHODS • SERVICE

OAKITE PRODUCTS, INC.
1001 E. First St., Los Angeles, Calif.
or 681 Market St., San Francisco, Calif.

Tell me about Oakite methods for removing the
following soils:

- ☐ ALSO send a FREE copy of your booklet "Some good
things to know about Metal Cleaning"

NAME _____

COMPANY _____

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Cost Less Because
THEY'RE SURESEAL ^{PK} COATED

These tough-hided gloves will knock your costs for
a loop on the rough jobs. Tops in chemicals, too.
Man-sized, comfortable curved fingers. All standard styles.
Ask your distributor, or write direct. Dept. A.

THE SURETY RUBBER COMPANY
WESTERN DIVISION: 544 Market Street, San Francisco 4

drive assembly which eliminates gears. Pre-set interval and elapsed time are both clearly visible on a 3 3/8" diameter dial. Timer is available for either 115 or 230 volts AC. Outside dimensions are 4 1/2" wide, 4 1/8" deep, and 8" high, including terminal strips.

Available from: General Control Company.

E-529

Counterbores and Step Drills

Features claimed: High-precision is claimed for these new items made of carbon or high-speed steel or special steel alloys. The tools have tolerances of .0002" on diameter and .0003" on eccentricity. They are used for a variety of precision machine operations and include: Straight and Angle Shoulder, Cutting and Non-cutting Pilot, Single and Double Ended, from 2 to 5 cutting diam-



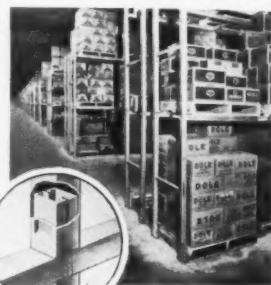
eters, and Straight and Spiral Flute.

Available from: Woodruff & Stokes Company.

E-530

Prefab Pallet and Skid Racks

Features claimed: Modern and convenient grocery warehouse storage is achieved by use of these prefabricated pallet and skid racks. Design features permit double tiering of stock for easy filling of orders. Reserve goods are placed on third tier. Net result is shorter assembly lines and faster handling. Racks are assembled without bolting or welding. Horizontal and upright frames can be put together in "pressed fit."



Available from: American Metal Products Co.

E-531

For Cleaner Goggles

Features claimed: Designed for keeping safety goggles clear, clean and polished is this new silicone treated lens tissue and compact dispenser. Tissue is 5" x 6 3/4" in size. Sheets are packed 800 to a packet, six packets to a carton.

"FRAY"

**MICROMETER
OFFSET BORING HEAD**

*It's safe - no projections.
Smooth, rounded edges.
Easily read graduations.
Two boring bars supplied
with each head.*

Produced under Pat. 2305737



WRITE
FOR
DETAILS

FRAY MACHINE TOOL CO.

515 West Windsor Road, Glendale 4, California

val and
diameter
its AC.
" high,

It removes dust, dirt, lint and smears, and leaves an invisible silicone coating on lens, making each wiping last longer and each cleaning easier. Dispenser for this tissue is made of 20-gauge steel, is easy to install and locks to prevent pilfering.

Available from: American Optical Company, Safety Products Div.

E-532

Burr-proofed Gage Blocks

Features claimed: "AA" grade gage blocks are again available, due to defense industry requirements for absolute interchangeability between parts and assemblies.



These super-accurately classified gage blocks are used as laboratory masters, and provide means of checking working gage block sets, precision comparators and other precision gage instruments. They are available in 37 and 83 piece sets,

and are "burr-proofed" to prevent nicks and burrs.

Available from: The DoAll Company.

E-533

Durable Bright Metal Finish

Features claimed: Unichrome Clear Dip, produced with zinc plate, has eye-appeal similar to that of chromium plate and possesses protection against rusting of zinc. Fin-

ry ware-
fabricated



y goggles
ated lens
" in size.
a carton.



WRITE
OR
DETAILS

ic

ay, 1951

Eyes Right!
RIGHT LIGHTING

• The eyes have rigid requirements in efficient lighting. Smoot-Holman certified illumination meets those requirements with unvarying quality and performance created by superior engineering and skill. Beauty, high efficiency and dependable operation are the hallmarks of the finer lighting equipment that bears the Smoot-Holman label in institutional, commercial and industrial installations.



OFFICES IN PRINCIPAL WESTERN CITIES • BRANCH AND WAREHOUSE IN SAN FRANCISCO

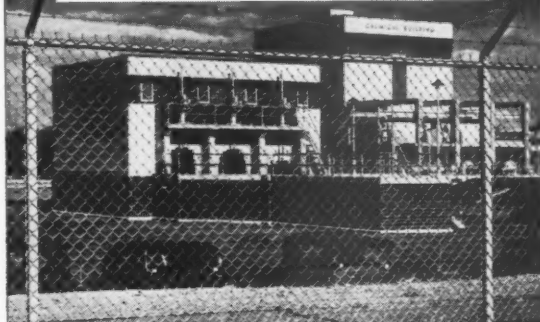
May, 1951 — WESTERN INDUSTRY

REALOCK

PROTECTION PLUS

- ▶ All fittings, hinges and locking devices have bolts *on the inside*, secure from tampering.
- ▶ Heavily galvanized by a special process, Realock Fence is weather-resistant, extra strong and durable...costs little or nothing for maintenance.

For complete details refer to Sweet's Catalog. For free estimate consult your classified telephone directory—or write direct.

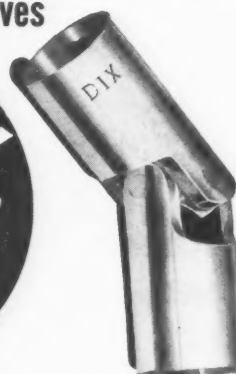


REALOCK FENCE



WICKWIRE SPENCER STEEL DIVISION 361 Delaware Ave., Buffalo 2, N.Y.
THE COLORADO FUEL & IRON CORP., Continental Oil Bldg., Denver 2, Col.
THE CALIFORNIA WIRE CLOTH CORP., 1080 - 19th Avenue, Oakland 6, California
BRANCHES & DISTRIBUTORS IN KEY CITIES EVERYWHERE

NOW ONE UNIVERSAL JOINT
For HIGH-load, HIGH-static
torque Drives



Highest grade, heat-treated alloy steel for greater strength. Ground to infinite degree of accuracy. No binding, backlash or inplay of pins. Concentricity guaranteed within .0005. Exceed Armed Forces rigid requirements.
14 SIZES—Bores 3/16" to 2".
Overall length 1 3/4" to 10 3/8".

Write for full descriptive literature.

Local stocks in San Diego, Los Angeles, San Francisco, Portland and Seattle

LOVEJOY FLEXIBLE COUPLING CO.

5092 W. LAKE ST.

CHICAGO 44, ILLINOIS

Mfrs. of Lovejoy Flexible Couplings & Variable Speed Controls.

Clipper

BELT LACING EQUIPMENT

For Belts and Tapes 1/16" to 3/8" thick



INSIST ON THE GENUINE

Industry's Most DEPENDABLE Belt Joints

Proven by use and comparison, Clipper Belt Hooks assure longest service. Made from uniformly high quality, fatigue resisting wire produced exclusively to meet our rigid specifications. For easy application and maximum uninterrupted service, use GENUINE Clipper Belt Lacers. There is a type and size for your needs.

Ask your Mill Supply Jobber for CLIPPER Products.



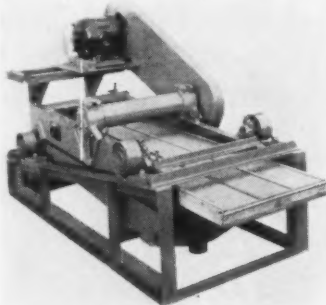
CLIPPER BELT LACER CO.
Grand Rapids 2, Michigan

OVERSTROM

VIBRATING SCREENS

FOR
LIGHT,
MEDIUM,
AND
HEAVY DUTY
SCREENING

WET or DRY



The single deck heavy duty Overstrom Vibrating Screen illustrated is one of many types and sizes available for the screening of palm oil, drilling mud, rock and gravel, slurries, limestone, cement, gypsum, borax, salt, and food products such as fish, and fibrous fruits.

Overstrom screening machinery accepted by industry throughout the world, is available for various applications, in any type or size, single, double or triple deck models, open type or dust-housed complete with hoppers and chutes fabricated to your specifications.

Write today stating your problem.

FERNHOLTZ MACHINERY COMPANY
150 North Norton Ave. Los Angeles 4, Calif.

ish is produced by zinc plating the part to a thickness of .0002" to .0005", depending on the application. Then Unichrome Clear Dip is applied. This part of the process is flexible to allow for manual, semi-automatic, or full automatic operation. After the Clear Dipping operation, the parts are dried and given a dip or spray coat of Unichrome Clear Baking Synthetic B-115.

Available from: United Chromium, Incorporated.

E-534

Internal Thread Comparator

Features claimed: This instrument measures from pitch line of any one thread in a "nut" to pitch line of two threads lying diametrically opposite it. When set to a basic ring gage, it gives plus or minus deviations from basic pitch. Indicator reading is in tens of thousandths, and for any one setting, this unit has a range of plus or minus .003".



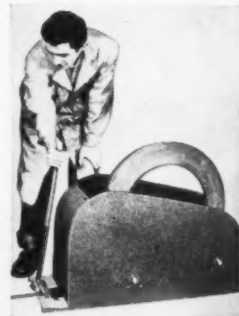
Comparator is portable and easy to install. It may be set to a ring gage quickly, and is used for checking threads of all classes of fit. Standard instruments are available for measuring NC threads 1/2"-13 to 4"-8, and NF threads from 1/2"-20 to 1 1/2"-12.

Available from: Rimat Machine Tool Company.

E-535

Dispenser for Steel Strap

Features claimed: Steel strap is easily and quickly dispensed at any desired length by this electric motorized coil dispenser. It uncoils 3/4" and 1 1/4" heavy duty steel strap along the floor so that when desired length is obtained, operator can cut it off with a manually operated shear, making this a one-man operation. Dispenser is loaded by rolling coil of strap into cradle and threading end of strap through dispenser. Positive chain drive is employed with 110-v., AC motor. Special motors for special currents are also available.



Available from: A. J. Gerrard & Co.

Keeping the Wheels of Industry Cool for 37 Years



MOTOR MICA
TRADE MARK REG. U. S. PAT. OFF.

ANTI-FRICTION COMPOUND

- ★ Solves Toughest Lubricating Problems
- ★ Cools Hot Bearings
- ★ Reduces Friction Drag
- ★ Prolongs Life of Machines
- ★ A Little Goes a Long Way

Packed in 5-10-25-50-100 lb. containers

Write for complete details and prices today. Ask for FREE Sample.
SCIENTIFIC LUBRICANTS CO. 3469 N. Clark St. CHICAGO 13, ILL.

HELPFUL LITERATURE

for the plant operator who wants to keep informed

536-L

Aluminum Fastening Methods

A new 136-page book entitled "Mechanical Fastening Methods for Aluminum" is now available to you by writing Reynolds Metals Co., 2500 South Third Street, Louisville, Kentucky. This gives detailed information on many different methods of fastening aluminum, such as metal stitching, resin bonding and mechanically formed joints. It also describes how to join aluminum to wood, plastics, fabrics and other metals.

537-L

Now We're Loggin'

Fruehauf Trailer Company of Detroit, Michigan, has published a new 12-page folder detailing features of its special line of logging equipment. Described in the pamphlet are Fruehauf's Medium Duty (TL-11), Heavy Duty (TL-55) and Extra Heavy Duty (TL-1010) "Super" Loggers.

538-L

Magnetic Protection

Eriez Magnetic Hump, designed to remove tramp iron from materials conveyed in pneumatic, gravity flow or liquid lines, is the topic of a new bulletin issued by the

Eriez Manufacturing Company, Erie, Pa. Information is included to aid industry in cutting down the damage which the presence of tramp iron can cause to expensive equipment.

539-L

Valves That Hold Pressure

The entire range of Shut-off, Selector, and Manipulator Valves for pressures from 0 to 6,000 psi. is discussed in a catalog released by Barksdale Valves, 1566 E. Slauson, Los Angeles 11, Calif. Explanatory copy and illustrations of the patented "Shear-Seal" principle are contained in the catalog.

540-L

Oil Burner Line

Ray Oil Burner Company, 401-499 Bernal Ave., San Francisco, Calif., offers a condensed 16-page catalog which gives a complete listing, with illustrations, of the company's oil burner products.

541-L

Complete Diesel Line

The complete line of Series 71 2-cycle diesel engines for application in industrial, petroleum, and marine fields is described in

a catalog released by the Detroit Diesel Division of General Motors Corp., 13400 W. Outer Drive, Detroit, Mich.

542-L

Sound Equipment

Cinema Engineering Co., 1510 W. Verdugo Ave., Burbank, Calif., has issued a new catalog with pictures and descriptions of sound equipment. Features of the new 11-Ay catalog include the listing of jacks and accessories, price reductions on control knobs and dials; and new products, including the new orthacoustic equalizer.

543-L

Crime Loss Control

American Mutual Liability Insurance Co., 142 Berkeley St., Boston, Mass., has published a graphic and highly readable book presenting the guiding principles of crime loss control. It is designed for use by principal accounting and financial officers of business enterprises.

544-L

Fire-resistant Fluids

UCON hydrolubes, their physical properties and advantages, are the subject of a 12-page booklet released by the Union Carbide and Carbon Corp., 30 E. 42nd St., New York, N. Y.

545-L

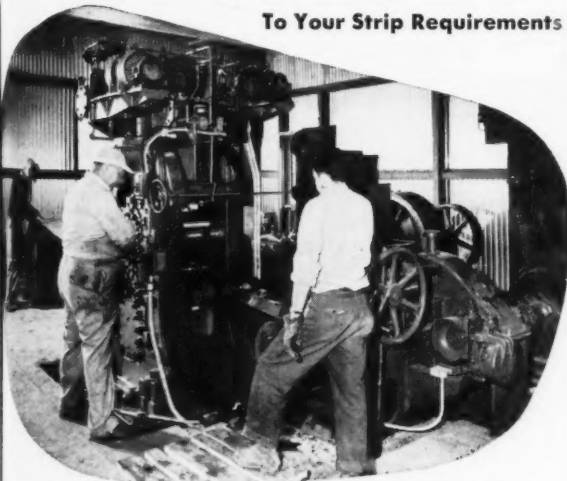
Potentiometers and Slide Rule

Helipot Corp., So. Pasadena, Calif., has issued a 32-page highly illustrated catalog, half devoted to its listed products and half given over to technical discussion of theories

NEW ROLLING MILL

Now ready to roll your ALUMINUM and STEEL

To Your Strip Requirements



Bliss 4-high cold rolling mill newly installed at General Coatings to roll strip for Southern California manufacturers.

- ✓ **Fast—Complete Service** . . . One week service for all your strip rolling needs. Size range to 10 1/2" width, 1/8" thickness.
- ✓ **Precision Thickness Tolerances** . . . Closer than mill tolerances. Custom rolling to your most exact specifications.
- Complete facilities for slitting (up to 12").

BRING YOUR COIL STOCK TO US.

GENERAL COATINGS CORPORATION

2126 E. 88th Street - Los Angeles 2 - LOgan 8-2481

May, 1951 — WESTERN INDUSTRY

save handling—
speed production

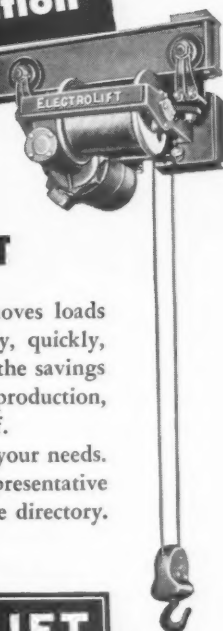
with
ELECTROLIFT
WORM DRIVE HOIST

Here's a one-man hoist that moves loads up to 6 tons smoothly, quietly, quickly, safely and economically. With the savings in handling and speed-up of production, ElectroLift easily pays for itself.

There's a model for each of your needs. Just call your ElectroLift representative listed in the classified telephone directory. Or write to:



ELECTROLIFT, INC., 30 Church Street, New York 7, N. Y.



American Felts



IN these times of scarcities, all users of felt will be glad to know that *immediate delivery* of American Felts can be made throughout the Pacific Coast area from stockpiles maintained by our Sales Agents, the A. B. Boyd Company.

American Felts available include those listed in Armed Forces specifications, which can be met exactly. In addition to supplying American Felt to exact requirements in sheet and roll form, the Boyd Company operates a skilled cutting shop which will produce cut parts to exact dimensions.

Consult the nearest of these Boyd Offices about your needs:

- 1235 HOWARD ST., SAN FRANCISCO 3, CALIF.
- 763 EAST 14th ST., LOS ANGELES 21, CALIF.
- 735 S. E. UNION AVE., PORTLAND 14, ORE.
- 404 DEXTER AVE., SEATTLE 9, WASH.

American Felt Company

TRADE MARK



concerned with the precision types of potentiometers, including linearity, noise, torque, resolutions and non-linear functions. The company is also starting to distribute an electrical slide rule with pictures and descriptions of 4 of its standard products on the reverse side.

546-L

Marking Devices

A "job-indexed" catalog of marking devices, designed to simplify selection of such devices, is offered by *New Method Steel Stamps, Inc.*, 147 Joseph Campau, Detroit. In this catalog, all standard holders for doing each particular class of work on machines or manually are outlined in a manner that makes selection of the appropriate method an easy matter.

547-L

Swiss Gear-Hobbing Machine

Now available from *Carl Hirschmann Company*, 30 Park Avenue, Manhasset, New York, is a four-page descriptive folder on Type 66 Semi-Automatic Vertical Gear-Hobbing Machine, especially developed by S. Lambert S.A., Solcure, Switzerland, for making all types of small instrument gears.

548-L

Low Cost Versatile Testing Machines

A new Super "L" line of hydraulic testing machines for tension, compression, transverse and flexure testing is fully described in Bulletin 40, now available from *Tinius Olsen Testing Machine Co.*, Willow Cove, Pa. Booklet covers both the electronic Selectorange Indicating System and the Olsen Electronic Recorder.

549-L

Roofing Brochure

Those concerned with roof maintenance will find that the 32-page brochure released by *The Tremco Manufacturing Co.*, 8701 Kinsman Road, Cleveland, Ohio, contains some very helpful information. It thoroughly explores such subjects as various types of roofs, how they are built, what factors enter into their deterioration, and how roof troubles can be diagnosed and treated.

550-L

Tape Specifications

"Scotch" brand pressure-sensitive tapes that meet government requirements are listed in a new pocket-sized catalog available from *Minnesota Mining and Manufacturing Co.*, St. Paul, Minn. Included are specifications for masking, cellophane, electrical, photographic, drafting and packaging tapes.

551-L

Cavitation Research Bulletin

"Accelerated Cavitation Research," a new 20-page bulletin issued by *Allis-Chalmers*, Milwaukee, Wisconsin, is based upon a paper presented at the annual meeting of American Society of Mechanical Engineers in 1949, and describes tests that were conducted to solve some of the problems of cavitation.

552-L

How to Run a Lathe

"How to Run a Lathe," Edition 50, may currently be obtained from *South Bend Lathe Works*, South Bend, Ind. Covered in this book, which has come to be a source of reference for skilled mechanics and text-

There's a Rapid Trend to Palletizing

WITH

MOTO-TRUCKS



One of several Moto-Truc Model "S" Motorized, Battery Operated Telescopic Hi-Lift Walkie Type Trucks handling open bottom pallets at Thompson Products Co., Cleveland.

● Palletizing with MOTO-TRUCKS saves space and Labor.

Since turning to palletizing with Moto-Truc, Thompson Products Co. has been able to use about 25,000 fewer square feet of floor area to do the same job of warehousing, and save labor.

A FEW EXCLUSIVE FEATURES OF THE MOTO-TRUC:

The overall length of Moto-Truc Telescopic Hi-Lift Trucks is shorter than other trucks of this type, due to more compact power unit, enabling operation in narrower aisles.

The controls, in easy grip roller type handle, reduce operator fatigue.

Four point mounting under load insures stability.

Powered by 12-volt motors for level operation and higher voltage ramp operation.

Better traction is obtained by Patented Articulating Hinged Spring Unit which holds the drive wheel down on floor.

WRITE FOR BULLETIN NO. 51 and Specifications.

HI-LIFT TRUCKS, PALLET TRUCKS, PLATFORM TRUCKS, CRANE TRUCKS

Representatives in all principal cities in United States and Canada.



WESTERN INDUSTRY—May, 1951

book for students, are the following subjects: correct installation and leveling of lathes, grinding cutter bits, turning, boring, thread cutting, taper turning, drilling, reaming, tapping, etc. Copies are 50¢ in paper binding; \$1.00 in imitation leather binding.

553-L

Heat Treat Review

Gas carburizing furnaces, their design and operation, are featured in the second number of "Heat Treat Review." Copies of this magazine may be obtained by writing the publisher, *Surface Combustion Corporation*, Toledo 1, Ohio.

554-L

Viscorator Instruments

A new catalog now ready for distribution describes Viscorator instruments which provide a method for determining viscosity values for industrial processes. For a copy of Catalog 88, write *Fischer & Porter Company*, 4030 County Line Road, Hatboro, Pa.

555-L

Coupling Catalog

The *Hansen Manufacturing Company*, 4031 West 150th St., Cleveland, Ohio, has for you an attractive and informative catalog on quick connective couplings. Catalog incorporates complete information, engineering data, dimensions, etc., pertaining to any type of Hansen coupling.

556-L

American Industry at Work

An interesting two-color, 32-page booklet, released by *R. D. Wood Company*, Independence Square, Philadelphia, Pa., is designed to give an informative picture of the firm's facilities, methods and equipment, particularly as they relate to manufacture of hydraulic presses, valves and allied equipment.

557-L

Aircraft Steels

A condensed listing of essential features of new Military Aeronautical Specifications is published by *Joseph T. Ryerson & Son, Inc.*, P. O. Box 8000-A, Chicago, in a 68-page booklet. Included is a digest of many Air Force-Navy, Federal and Aeronautical Materials Specifications pertaining to steel.

558-L

Mechanized Materials Handling

In the current issue of its magazine, "Materials Handling News," *Clark Equipment Company, Industrial Truck Division*, Battle Creek, Michigan, makes a report to industry on its new and better Mechanized Materials Handling. Report covers the Dynatork Drive, an improved line of electric battery-powered fork-lift trucks, the newly developed hand-pallet trucks, Model-B Clamp, Pul-Pac, and other new attachments.

559-L

Caterpillar Products

Caterpillar Tractor Co., Peoria, Ill., makes available a complete listing of its products in a new 40-page catalog. Featured in it are 81 products, including 11 new models announced during last year.

560-L

Yale & Towne Catalog

General description of and application data on Yale's gas and electric fork lift trucks, motorized hand trucks, hand lift trucks, and hand and electric hoists, as well as a list of attachments available for these

HERE'S HOW TO PREVENT COSTLY FALLING ACCIDENTS



37 Falling Accidents
Every Hour*

A.W. ALGRIP ABRASIVE ROLLED STEEL FLOOR PLATE

This revolutionary ABRASIVE Floor Plate makes it possible for you to give your workmen the best non-slip protection against costly falling accidents.

A. W. ALGRIP is made by rolling abrasive grain, the same type used in grinding wheels, uniformly as an integral part of the upper portion of steel plate. Result: A floor plate that's non-slip even on steep inclines. ALGRIP requires no maintenance attention and wear exposes new abrasive particles so it keeps its gripping qualities. Wet or dry ALGRIP is non-slip. It's easy to keep clean and can be cut and installed overnight.

Architects, engineers, designers and safety engineers are specifying A. W. ALGRIP for industrial and commercial applications. Get complete information about this revolutionary ABRASIVE Floor Plate now. Write for booklet B-6.

THERE'S NEVER A SLIP

ON A. W. ALGRIP.



ALGRIP installed in elevators and on sills keeps passengers safe from slipping accidents.



ALGRIP is ideal for installation on engine and boiler room floors.

A.W. ALGRIP ABRASIVE ROLLED STEEL FLOOR PLATE ALAN WOOD STEEL COMPANY CONSHOHOCKEN, PA.

125 YEARS OF IRON AND STEEL MAKING EXPERIENCE

Gentlemen:

Please send me your 8-page information-packed booklet B-6.

NAME _____ TITLE _____
COMPANY _____
ADDRESS _____
CITY _____ ZONE _____ STATE _____

Other Products:
PERMACLAD Stainless
Clad Steel • A.W.
SUPER-DIAMOND Floor
Plate • Plates • Sheets
• Strip • (Alloy and
Special Grades)

*17% of the 222 occupational injuries which occur every hour are due to falls. Source: National Safety Council's 1949 edition of *Accident Facts*.

various units are covered in a 44-page bulletin recently released by *Vale & Towne Manufacturing Company, Philadelphia Division*, 11000 Roosevelt Blvd., Philadelphia 15, Pa.

561-L

Power Driven Belt Maintenance

Of assistance to owners and operators of power-driven belts is a chart entitled, "How to Care for and Maintain Your Belts," being offered by *Cling-Surface Co.* of Buffalo, New York. Poster presents steps to be taken in care, maintenance and treatment of all power-driven belts.

562-L

Magnetic Conveyor Element

New principles in conveying skelp, sheet, rod, bar, plate, pipe and shapes through installation of Magnetic Conveyor elements are illustrated and explained in Bulletin No. 553, prepared by *Eriez Manufacturing Co.*, Erie, Pa.

563-L

Safety First

An illustrated bulletin on the new Ross Safety Valve is available from *Ross Operating Valve Company*, 120 East Golden Gate, Detroit, Mich. Booklet features a cross-sectional view and installation data.

564-L

Cera-mite Capacitors

Available upon letterhead request from *Sprague Electric Company*, North Adams, Mass., is *Sprague-Herlec Engineering Bulletin 601B*, which details Cera-mite capacitors with voltage ratings as high as 1500

volts, as well as other ceramic capacitors including temperature-compensating, general application and high-k types.

565-L

Precipitron Described Non-technically

Westinghouse Electric Corporation, Sturtevant Division, Boston, Mass., offers you an 8-page leaflet which describes Precipitron electronic aid cleaner in non-technical language. Air cleaning units for factories, stores, offices and homes are covered.

566-L

Vaportight Fixture

New Appleton "V-51" series Convertible Vaportight Lighting Fixtures is fully described and illustrated for pendant, ceiling or bracket mounting, with or without reflectors and guards. Wattages, weights and dimensional data included. Available from: *Appleton Electric Company*, Chicago, Ill.

567-L

Santophen 45

Detailed information on chemical and physical properties of Santophen 45, a new product for controlling formation of slime in industrial cooling waters, is outlined in a bulletin released by the manufacturer of this product, *Monsanto Chemical Company*, St. Louis 4, Missouri.

568-L

Liftruk

Silent Hoist & Crane Co. issues a new bulletin describing its line of Improved Heavy-duty Fork Lift Trucks—the "Silent Hoist" Fork Liftruk. This piece is available by writ-

ing direct to the manufacturer in Brooklyn, New York.

569-L

Industrial Floor Repair

A two-page bulletin, "Stop Floor Hazards," is published by *Bitucote Products, Division of Bridges Paving Co.*, 1411 Central Industrial Drive, St. Louis 10, Mo. It includes a full description of Ready Patch, a factory-mixed, ready-to-use asphalt floor patching enamel.

570-L

How to Supply Cement Over Steel Gridwork

An illustrated bulletin showing step-by-step procedure to be followed in applying corrosion-resistant cement over steel gridwork is offered by *Pennsalt Chemicals, Special Chemicals Department*, 1000 Widner Bldg., Philadelphia, Pa.

571-L


Selection Chart

Just published is a wall-chart, designed to aid welders in selecting the particular All-State welding, brazing, soldering, cutting or tinning alloy and flux to serve best the job at hand with least cost. Request from *All-State Welding Alloys Co., Inc.*, 273 Ferris Avenue, White Plains, N. Y.


572-L

Bag Type Suppressor

For a full description of the new Whiting Bag-Type Dust Suppressor, which is effective for dust, fumes and smoke, write *Whiting Corporation*, Harvey, Ill., and ask for their 4-page booklet on this subject.



PRECISION
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The Growth and Development of Executives

By Miles L. Mace, Division of Research, Graduate School of Business Administration, Harvard University, Boston 1950, \$3.25.

Again and again, it has been said that one of the major, unsolved problems of modern business is that concerned with the development of executive material—particularly, top-executive or general-management people. Management consultants report that questions concerning the selection and development of executives are among those most frequently asked by their clients. The managements of many companies have come to realize that they have a number of highly-skilled specialists—but very few (or none) broad-gauged, competent management people.

The Growth and Development of Executives will not provide many specific answers. It raises a number of questions pertaining to executive selection and development that are faced by all companies; it gives a number of purported "quotations" on the problem from a wide sampling of top managements; and it presents some case histories of company practices, including the procedures and forms used. The names, locations and industries are disguised to observe "the confidential quality of the information."

Dr. Mace is Associate Professor of Business Administration at the Graduate School of Business Administration of Harvard University. He has, consequently, ample opportunity to become familiar with well-selected case information and acquainted with the top managements of most of America's leading businesses. His volume is no cold statistical or objective report, however, of existing company practice. Rather, he has attempted to determine "by selective inquiry" the major elements of executive growth in manufacturing businesses.

In taking his soundings, Professor Mace found no uniform list of executive qualities that seemed to fit the demands of all companies. He does list, however, several basic requirements which should prove of value to any management. Perhaps the major conclusion reached by the study is that the most effective method of executive development is actual executive experience. As Professor Mace points out "the best classroom is . . . the work

situation . . ." In reaching this conclusion a great deal of emphasis is placed on the importance of the superior officer and his responsibilities for "coaching." He includes a number of examples which ". . . constitute the basis for concluding that the most effective way of providing for the growth and development of people in manufacturing organizations is through the conscious coaching of subordinates by their immediate superiors." Management leaders with considerable business experience may perhaps question the ability of the average "immediate superior" to teach or to coach in anything other than his own particular methods of performance. Could such a coach not have many poor work habits and out-moded points of view which he would be transmitting to his subordinates? Almost all would agree with Professor Mace, however, that the superior must set the standards of performance.

One refreshing aspect of the volume is the manner in which Professor Mace quotes various executive opinions as to the danger of getting too well acquainted with one's subordinates and the importance of maintaining "dignity" and "position" and then proceeds to knock down these outmoded opinions and stress the importance of creating "a climate of confidence" in the superior-subordinate relationship. The volume is brief (195 pages) and very easy to read. Some management readers will criticize it for not giving them answers, but others will recognize the importance of the many questions, though unanswered, which it raises.

Reviewed by:

JOSEPH M. TRICKETT
Dean, School of Management
and Lecturer in Organization
and Administration.

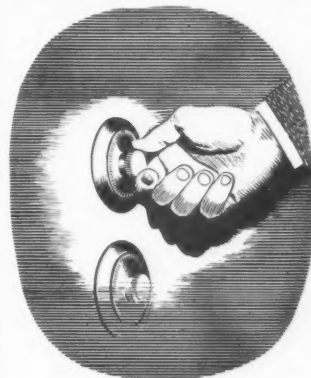
Developments in Multiple Line Underwriting and Catastrophe Coverages

American Management Association, New York, Insurance Series No. 89, 1951.

Includes: Broader coverage through multiple line underwriting. Indemnity limits of third-party coverage. Catastrophe, excess and deductible fire and business interruption insurance. Pitfalls in valuation for inventory and business interruption insurance.

Reviewed by
BERNA M. CARLSON
College Librarian

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THE WEST ON ITS WAY

ARIZONA

IT'S NATURAL—El Paso Natural Gas Company has submitted three applications to the Federal Power Commission requesting permission to expand its facilities to provide extra millions of cubic feet of gas to three areas: To Arizona, New Mexico and Texas an extra 100 million cu. ft. is proposed, at an estimated cost of \$23,250,000; 200 million cu. ft. will go to the Southern California Gas Company, Southern Counties Gas Company, and Pacific Gas and Electric Company, costing about \$51,720,000; PG&E will receive 100 million cu. ft. for delivery at the California-Arizona border near Topock, Arizona, and will pay an estimated \$16,970,000.

CALIFORNIA

TO KEEP 'EM FLYING—Largest aviation gasoline contract ever negotiated by an airline in the history of commercial aviation is signed between United Air Lines and Standard Oil Company of California. The contract, in excess of \$25,000,000 to cover gasoline needs of United for the years 1952, 1953, and 1954, for all operations between Salt Lake City, Utah and the West Coast, the length of the Pacific Coast and from California to Hawaii, becomes effective January 1, 1952. Contract is exclusively for gasoline and represents approximately 46% of needs of the company over its entire system for the three years.

WATER! WATER!—Sunnyvale, California plant of Westinghouse Electric Corporation is awarded a \$140,000 contract to build three 84-inch-inlet diameter Staats-Hornaby hollow jet valves for use on an irrigation project at Kajakai, Afghanistan. Valves will be delivered in 1952. Morrison-Knudsen Afghanistan, Inc., are prime contractors for the project, which includes building a modern canal system and storage reservoir to

serve 155,000 acres in the Helmond Valley. The reservoir has the additional reserve capacity to serve another 500,000 acres in the Valley.

EARS IN THE AIR—Antenna research effort will be quadrupled at Lockheed Aircraft Corp.'s Burbank plant, with completion of a \$400,000 4-story research laboratory. Problem of giving fliers equipment to communicate over longer distances and still not impede speed and maneuverability of plane by many extending antennas is main consideration of Lockheed engineers. With the advent of flush antennas, radio design now mainly precedes structural design of aircraft.

RAIL COMMUNICATION—Western Pacific Railroad will equip a total of 40 switching locomotives with adjacent channel two-way radio units, manufactured by Bendix Radio Division of Bendix Aviation Corporation, becoming first of the nation's 131 class one railroads to apply radio communications to all its yard and switching operations. Yard offices to be provided with the facilities are located at San Francisco, Oakland, San Jose, Stockton, Sacramento, Oroville and Portola in California, and at Elko, Nevada.

MORE SPACE FOR ARROWHEAD—Aircraft duct division of Arrowhead Rubber Company of Downey, subsidiary of National Motor Bearing Company, will move to Long Beach, where terms of five year lease provide 27,000 sq. ft. of manufacturing area, tripling that now encompassed. Move was favored over plans to enlarge the Downey plant, saving two months of valuable production time for world's largest producer of air ducting fabricated of glass cloth and synthetic rubber which has replaced metal ducting on most aircraft applications.

PRESSURE IN THE AIR—Contract for supplying complete air conditioning and pressurization systems for the first 100 new Convair Liner 340's is awarded to AiResearch Manufacturing Company, Los Angeles. Completely integrated, the

system will control cabin altitude and air conditioning automatically in order to insure maximum passenger comfort from sea level to above 20,000 ft., including complete air conditioning while aircraft is on the ground. Convair Liner 340, latest of high-performance American transports, is built by Consolidated Vultee Aircraft Corp. of San Diego.



TUNNEL LINERS—American Pipe & Steel Corporation of Alhambra completes 6,000-ft. section of giant tunnel liner for project to bring water from Owens River to Los Angeles. A total of 200 joints of 1/4-in. wall pipe, 30 ft. long, 104-in. diameter, was trucked one joint at a time from American's fabricating plant to the site of the tunnel. This completes American's second contract for the Owens River project.

HARD FACTS—Calaveras Cement Company launches a \$2,235,106 expansion program which will increase production capacity of its San Andreas plant by 50%. Delivery and installation of equipment, including a fourth kiln, an electrical precipitator designed to prevent flue dust from escaping through the company's stack, a cooler, and facilities for Grinding and Quarry Departments, will take a full year.

VISCOUS CIRCLE—General Petroleum Corporation, Los Angeles, awards a construction contract in excess of \$2,000,000 to Bechtel Corporation for sal-

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vage of its 38-year old Mojave pipe line and for the line's reinstallation at San Ardo in Northern California. Paralleling the 8-in. line at San Ardo will be a smaller line to carry the light petroleum product to be blended with the San Ardo crude oil, a heavy viscous crude which requires blending and heating for easy flowability. Three steam-powered and one electric pumping stations will be erected along the 40-mile route, and each station will have facilities for reheating the oil as it passes through. Seven tanks having a capacity of 283,000 barrels will be erected to handle the crude oil, blending stock and blended oil.

PLANT FIR PLYWOOD—The Durable Fir Lumber Co. of Arcata is the site of a new plywood plant to be erected by Durable Plywood Corporation, organized for the purpose.

TUBES FOR TELEVISION—Varian Associates in San Carlos will begin production of a new 4 ft., 200-lb. klystron type vacuum tube for General Electric's new television transmitter, designed for ultra high frequency transmission. Increased production of the former, plus tubes for other communication and industrial uses will necessitate expansion of Varian's facilities, viz., the trebling in size of the San Carlos factory and the construction of a new plant in the Palo Alto area, costing nearly \$2,000,000, including equipment.

RENAISSANCE—On request of electrical workers union, General Electric opens again its Oakland transformer plant, closed in October 1950 as a result of a strike. The incentive system, to which the union had objected, will be continued on agreement of the workers, as the operations of the plant are profitable only on a piecework basis.

FOUNDRY FOUNDED—Rosán, Inc., of South Gate opens a new foundry division, thus expanding present plant facilities. Extensive research program will be instituted, including development of new casting methods and experimental work in solving industrial fastening problems.

ROCKET BOOM — A new plant in Azusa, Electrotechnic Corp., is soon to reach capacity production of electronic, electrical and radio equipment, in demand by the aircraft industry. Among other things, they will make rocket firing devices for Lockheed Aircraft Corp. and airport control tower receivers for the CAA. Already expanding, the company's two buildings will be increased to four when engineering and packing divisions are completed, enclosing 5,500 sq. ft. total, within 60 to 90 days.

OIL'S WELL—Production of linseed oil at the Glidden Company's Buena Park vegetable oil plant will be sharply increased by installation of a new type quarter-million dollar extraction plant. By installation of the new process, an outdoor operation, equipment may be used for various other oil bearing seeds.

GUESTS FOR DAVY JONES — Lockheed Aircraft Corporation, Burbank, announces new model of Navy's P2V bomber, developed for anti-submarine warfare. P2V-5 has, unlike its predecessor, a nose turret armed with cannon, and two tip tanks "center mounted" at extreme end of wings, rather than slung, beneath them. It carries appre-

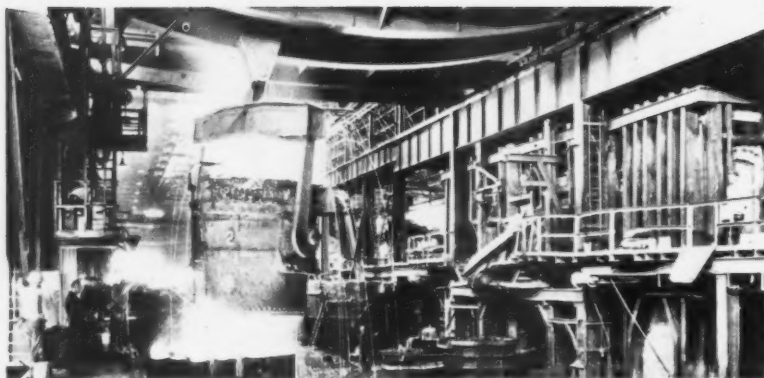
In Los Angeles

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NEW ARRIVAL AT BETHLEHEM—Recently installed in South San Francisco plant of Bethlehem Pacific Coast Steel Corp. is a 115-ton Whiting Corp. crane, equipped with GE motors and controls, motors totaling 180½ hp., and accommodating a larger ladle which permits heavier heats to be tapped from the furnaces.

ciably more radar and electronic equipment in addition to its heavy armament than any previous model. Purchase of P2V-5 by England and Australia as well as by U. S. Navy is regarded as a significant step in standardizing the weapons of the Allied nations. Long range, all-weather performance typifies the sub-killer.

FEET OF STEEL—American Pipe & Steel Corporation of Alhambra completes their contract for a 6,000-ft. section of steel tunnel liner for Owens River Gorge project. Contract called for 200 joints of ¼ x ¼-in. wall pipe, 30 ft. in length, 104-in. in diameter; each joint was carried singly from Alhambra fabricating plant to the aqueduct.

AERIAL EGG BEATERS—McCullough Motors Corp., Los Angeles, forms Helicopter Division, with headquarters in a separate helicopter building newly constructed near its main plant. In addition, 250,000 sq. ft. will be added to the main plant, providing additional capacity and facilities as required for production of all major MC-4—their new tandem-rotor, two-place helicopter—airframe components. Designed primarily for use in crop-dusting, pipe line patrol, forest fire spotting, the MC-4 holds particular promise as a helicopter for private ownership due to its simplified controls and moderate cost.

READY-MIX FINISH—Chromatone Corporation is newly established for manufacture and marketing of ready-mixed silver, gold and bronze finishes and synthetic enamels. Corporation has headquarters at 1527 Grande Vista Ave., Los Angeles.

HERE'S THE PITCH—Koppers Company, Inc. plans construction of a plant at Fontana, next to Kaiser Steel Company plant, for making of enamel pipe coatings and roofing materials. This plant, although 25th to come under administration of Tar Products Division, is first of its kind to be built west of the Rockies, and will depend upon Kaiser for supply of pitch, indispensable raw material for production.

HOT STUFF FOR COLD WAR—Hamel Radiator Engineering Co. of Los Angeles, manufacturer of automatic gas heating equipment for residential and commercial use, creates a War Plant

Division, which comprises a modern, well-equipped precision machine shop with turret lathes as large as 2½ in. capacity plus basic equipment for all types of sheet metal fabrications.

CAN'T SAY—Security restrictions of the Atomic Energy Act prevent public description of nature of work to be carried out at Weldon Spring, Missouri, where California Research and Development Company, subsidiary of Standard of California, is to be architect-engineer-management contractor of a new AEC developmental facility. Weldon Spring Ordnance Works is the site of activity.

ALL TOGETHER NOW—To consolidate its operations under one roof, American Cyanamid Co. will move its Los Angeles offices and warehouses to a specially built 64,000 sq. ft. structure. Costing about \$5,000,000, the building is located in the central manufacturing district.

RYAN HANGS ONE ON—A new warehouse-hangar is being built at Ryan Aeronautical Co.'s plant in San Diego. Service and spare parts departments will inhabit the 16,000 sq. ft. building constructed by Trepte Construction Co. of San Diego; space will be left in the main factory for increased production of military aircraft components.

FIRM BY ANOTHER NAME—Name of Cannon Electric Development Company, Division of Cannon Manufacturing Corporation, Los Angeles, is changed; it is now Cannon Electric Company. New phone number is CApitol 5-1251.

MODGLIN GROWS TO MEET NEEDS—Modglin Co., Inc., 3235 San Fernando Rd., Los Angeles, expands its facilities by approximately 50,000 sq. ft. to include a new metal working division.

AIRCRAFT DIVISION REACTIVATED—Langley Corp., San Diego, reactivates its aircraft division and has orders exceeding \$1,000,000. The company plans to increase its participation in defense work, and about double its number of employees.

JACKS IN SAN LEANDRO—Malabar Manufacturing Co., makers of hydraulic jacks for aircraft manufacturers, airlines, and the Air Force, begins construction of \$350,000 plant in the Bay

Area. Employees, numbering approximately 100, will pursue activities in the 32,000 sq. ft. structure, a division of Osborne Machinery Company of Los Angeles.

TEN-PLAN—Ten new 340 Convair airliners will be delivered to Delta Air Lines of Los Angeles, starting in 1952. Consolidated Vultee Aircraft Corp. promises the planes, stimulated by a \$6,000,000 contract. Delta has signed an option to buy five more.

AIR-BORNE FIGHTERS—A "substantial additional quantity" of Scorpion F-89 all-weather interceptors will be produced by Northrop Aircraft, Inc. of Hawthorne for the Air Force. This second production boost authorized by the Air Force raises the company's backlog to approximately \$300 million.

DOUBLE UP—Sub-contracting to Lockheed to produce component parts of Navy P2V necessitates doubling of manufacturing space by Kaiser-Frazer Corp. in its Oakland aircraft division. A one-story building containing 50,000 sq. ft. of floor space will be completed in June.

HILLER EXPANDS—Plant No. 2 of Hiller Helicopters, located in Redwood City, three miles from the main plant, will be used for manufacturing operations, office space, and provide a training center for armed forces' pilots and mechanics. Government orders for Army H23 and Navy HTE helicopters have necessitated the acquisition of 60,000 sq. ft. of additional space.

COLORADO

SECRET OPERATIONS—Santa Fe Operations Office, U. S. Atomic Energy Commission announces construction of specialized research laboratory on a section of National Bureau of Standards grounds south of Boulder. Stearns-Rogers of Denver are architect-engineers. When completed, the facility will be operated by National Bureau of Standards; an operating staff of about 50 persons will be employed, many of whom will be scientists and specialized technicians.

CLASSIFIED ADDS—U. S. Atomic Energy Commission will build a \$45,000,000 production plant for handling radioactive material on a 4 sq. mi. site in the Rocky Flats area of Boulder and Jefferson Counties. Administered by AEC's Santa Fe Operations Office and operated by Dow Chemical Company, Midland, Michigan, full operations will require 1,000 persons on the payroll. Austin Company of Cleveland, Ohio, will prepare plant design and supervise construction; about 2,000 construction workers will be employed during peak of building in early 1952. As far as possible, construction contracts will be let on a competitive, lump sum basis.

IDAHO

ANOTHER BEAN IN THE POT—Nampa Products Co.'s packing plant at Nampa is purchased by Birds Eye Division of General Foods Corp. The facilities, formerly held under lease by Gen-

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eral Foods, contains one production line for processing of quick frozen small lima beans. Plans for eventual installation of two more lines are under way. Birds Eye employs about 250 workers at the season's peak.

NEVADA

SHEELITE HOLDING CHANGES HANDS—Tungsten-Carbide Co., subsidiary of Kennametal, Inc., of Pennsylvania, purchases Nevada Scheelite Co.'s properties near Rawhide, Nevada. Plans for development include housing for employees. Purchase price is not disclosed.

OREGON

BAGS UNDER THEIR EYES—Additional manufacturing and warehousing operations of Portland's Noon Bag Company will be housed in a new 150 by 200-ft. one-story concrete structure at N.W. 21st Avenue, N.W. York and N.W. Reed Streets.

STOCK IN TRADE—Pabco Products, Inc., acquires all outstanding capital stock of Pacific Roofing Co., Portland. Pacific Roofing Co. operates a felt mill and roofing plant on land owned by it at Portland, and a small roofing plant on land leased at Tacoma, Washington. No changes are contemplated in name, operations or policies.

HIGH-PRESSURE EFFICIENCY—Debarking logs by means of 1,200 pounds of pressure exerted by hydraulic equipment is part of program to increase pulp making efficiency instituted by Oregon Pulp & Paper of Salem. Plant improvements will cost \$750,000.

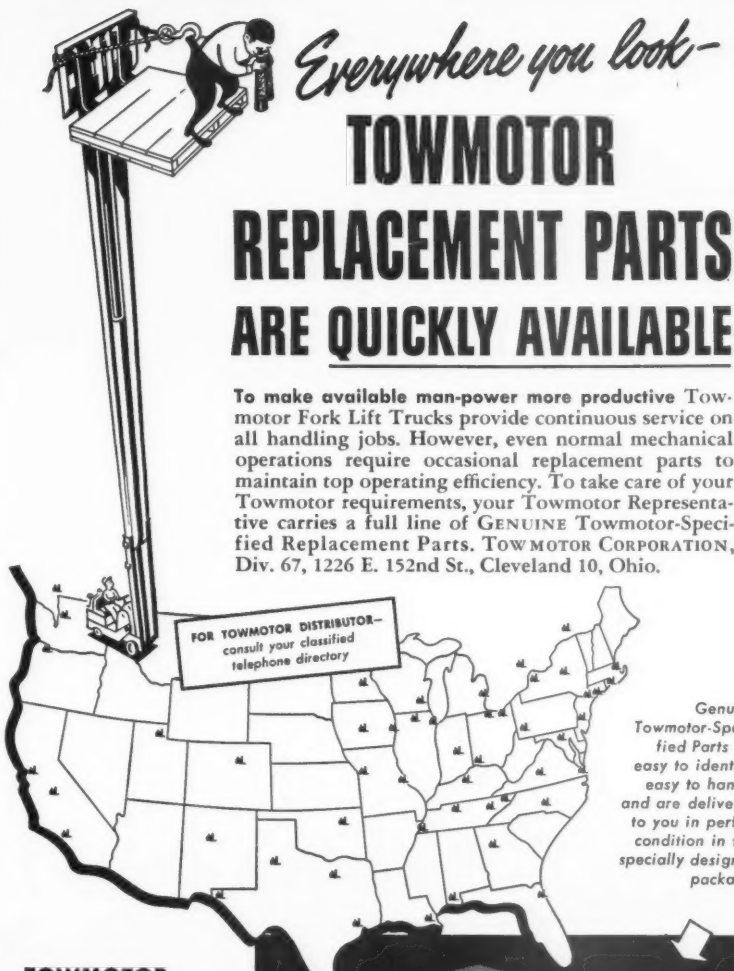
UTAH

FIERY FURNACE—Murray Refractories Co., affiliate of Gladdin, McBean & Co., manufacturers and distributors of silica brick used in industrial furnaces, plans \$170,000 plant expansion program at Salt Lake City. New installations will permit a 25% increase in production. To be included in additional facilities, pending approval of Defense Minerals Administration of amortization allowances, is a \$86,000 fire clay grinding unit.

WASHINGTON

COLD WAVE—Pacific Car & Foundry Co. of Renton has orders for 2,100 refrigerator cars for 1952. 500 will go to Bangor & Arrostook Railroad, 400 to Western Fruit Exchange; 10 a day are coming off production line for Fruit Growers Express. Seattle, Portland & Spokane Railway will receive 200 flat-cars.

CHOCOLATE AND STRAWBERRY TOO?—Semi-finished vanillin employing use of lignin, a pulp mill by-product, will be produced at Monsanto Chemical Co.'s new plant in Seattle, the product to be shipped to the company's plant in



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St. Louis for final refining. Total cost for new facilities at both installations will be about \$1,500,000.

PIPE DREAM—Seattle area will be site of a plant to be constructed by U. S. Concrete Pipe Corp. of Los Angeles. They will install for the city water department the Bow Lake pipeline, a \$1,903,641 contract, and to facilitate delivery of pipe will build a \$500,000 plant south of Seattle. Eastern Washington area shortly will be included in the Los Angeles firm's operations when a pipe fabricating plant is constructed to produce pipe for reclamation areas.

BTU, HEAT TREATMENT TOO—Surveys to determine amount of heat needed to process fruit and vegetable tonnages

to be produced in newly reclaimed land of Columbia River Basin are under way by Division of Industrial Research and Department of Agricultural Economics. Statistics on types of produce plus means of processing are gathered from Yakima Valley, crop land similar to reclaimed Columbia area.

BOEING REVS UP—More than \$10,000,000 worth of new machinery and equipment will be acquired for use at Boeing Airplane Company's Seattle and Renton plants. Plant Engineering Department and Austin Co. are conducting surveys to determine what new buildings will be required. Need for new buildings and machinery is brought about by production orders for B-52's and acceleration of current work programs.

Suggestions to Army Prove Lucrative


JOSEPH CICOONI, San Francisco, has received an award of \$100.00 from Army Suggestions and Awards Program at San Francisco Port of Embarkation, according to information released by Armed Forces Public Information Office, San Francisco. Cicooni's research made it possible to obtain terminal allowances of 3 cents a hundred pounds on household goods received from overseas. He was awarded \$100.00 last fall for making possible a similar saving on export movements.

Ernest Woods, San Francisco, received \$25.00 for designing a sanding disc, and \$10.00 for inventing a clamp for removing and installing hoist truck piston rods.


Henry A. Anderson, San Francisco, was given \$25.00 for devising a method of firmly locking a semi-trailer to a tractor.

Willie Flowers, Oakland, and Clement DeCota, San Francisco, each received \$10.00 for a jointly devised tool for removing tires from rims.

Ira L. Starns, Richmond, was awarded \$10.00 for an easy-to-fabricate trash can cover.



Lessons in Chemical Economics NUMBER 1



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← LOSS
PROFIT →

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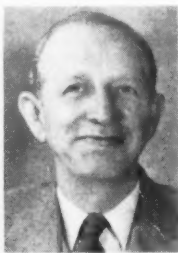
WESTERNERS AT WORK

Arizona

D. L. BOUSE becomes director of the new Industrial Division of Business Development Department of *Valley National Bank* in Phoenix. Bouse was formerly industrial field representative in the Bank's Commercial Loan Department.



Bouse



Monroe

California

Marman Products Co., Inc., Inglewood, names ROBERT MONROE as director of materials. He takes over for E. W. ROCHE who is retiring.

We Grow and Grow and Grow!

King Publications purchases *Implement Record*, long-established farm equipment publication. OSGOOD MURDOCK, former owner, joins us as editor.

WM. S. TOWNE replaces H. R. MANSFIELD as president of *Pioneer Rubber Mills*, San Francisco. R. F. HOTLE is new executive vice president for Pioneer.

Appointed to National Production Authority for San Francisco Regional Office of Department of Commerce are E. J. SPIELMAN as regional attorney, and A. G. KEATING as production engineer.

Named to newly established Gas Industry Advisory Council are the following: JAMES B. BLACK, *Pacific Gas & Electric Co.*, San Francisco; A. F. BRIDGE and H. L. MASSER, *Southern Counties Gas Company of California*, Los Angeles; N. HENRY GOLLERT, *Seattle Gas Company*, Seattle, and C. H. GUEFFROY, *Portland Gas and Coke Co.*, Portland.

A. M. NEWHOUSE now is vice president in charge of production, *Van de Kamp's Holland Dutch Bakers, Inc.*

PAUL RICHMOND, formerly administrative assistant for *Pasadena Star News*, is named personnel manager of *National Motor Bearing Co.*, Redwood City.

WALLY REID, *Hunt Foods* Export division manager, will serve with the Commerce Department's West Coast Advisory Committee on International Trade.

MARVIN LEROY LEE, formerly production superintendent at Kaiser's Trentwood, Washington, rolling mill, is now manager of operations at *Kaiser Aluminum & Chemical Corporation's* recently-leased Halethorpe, Maryland, aluminum plant. JOHN G. PATTEN be-

comes assistant general traffic manager at *Kaiser Aluminum & Chemical Corporation* in Oakland. Patten was formerly Western traffic manager for *New York, New Haven & Hartford Railroad Company*.

HENRY BRANDLER steps up to position of executive vice president of *L. A. Period Furniture Manufacturing Co.*

Grand Central Aircraft Co., Glendale, promotes three staffers. RAY HART, former secretary-treasurer, becomes vice president and treasurer; ELAINE O. CARSE, former assistant secretary, advances to secretary and SANFORD CARPENTER, internal auditor, becomes assistant secretary.

WILLIAM B. KEIRN now holds the superintendent's job for the cold rolling mill and the new tin plate mill now being constructed at the Fontana Works of *Kaiser Steel Corporation*.



Keirn

PAUL YOUNG, president of *Golden State Company, Ltd.*, is appointed a member of the Dairy Industry Advisory Committee of the U. S. Department of Agriculture, for the duration of the emergency.

W. F. BARBAT takes over position of chief geologist for *Standard Oil Company of California*. He succeeds DR. W. S. W. KEW, retiring in the middle of June. Standard also announces some appointments in its exploration department. O. F. VAN BEVERAN becomes assistant general manager. E. C. DOELL will headquarter in Los Angeles as district exploration superintendent, southern district. W. P. WINHAM goes to Salt Lake City as Great Basin district exploration superintendent, and E. H. BURTNER will supervise

exploration activities for the northern district of California with his office in Bakersfield.

JOSEPH R. BRADEN, vice president of *Richmond-Chase Company*, San Jose, is appointed to the State Water Pollution Control Board.

JOHN N. BYRNE will supervise the asbestos-cement plant of *Pabco Products, Inc.*, in Redwood City. Byrne, a graduate in chemistry of the University of California, has been with Pabco since 1941.

W. R. BOWMAN is Pacific Coast production manager for the *National Lead Co.*

ALDEN G. ROACH, *Columbia Steel Company* president, and WALTHER MATHESIUS, president, *Geneva Steel Company*, are members of the new research policy committee set up by *United States Steel Corporation*.



Brisbois

N. M. BRISBOIS, vice president of *Fibreboard Products, Inc.*, San Francisco, is serving as head of Paperboard and Board Products Section of Economic Stabilization Authority.

B. P. ALTICK is a new vice president of *Fibreboard Products, Inc.* He has served the company and its predecessor for more than 25 years.

California Manufacturers Association appoints committee chairmen for 1951 as follows: *Government Procurement Relations*, R. A. LIVINGSTON, Tubing Seal Cap, Inc., chairman; vice chairman, L. W. STETTNER, Victor Equipment Co. *Industrial Services*, RALPH M. HOFFMAN, Link Belt Co., chairman; vice chairmen, E. E. CHAPPELL, Chev-

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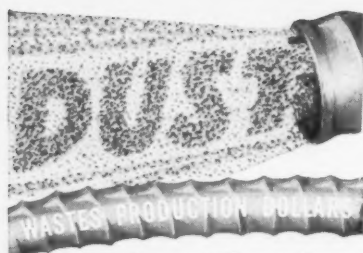
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rolet-Oakland division and A. W. ABRAHAMSEN, Norris Stamping & Manufacturing Co. Freight Traffic, A. P. HEINER, Kaiser Steel Corp., chairman; vice chairmen, L. J. ROWLEY, Lockheed Aircraft Corp., and H. A. LINCOLN, Fibreboard Products, Inc. *Unemployment Insurance*, C. A. FEGTLY, Pittsburgh-Des Moines Steel Co., chairman; vice chairmen, D. C. PATRICK, W. P. Fuller & Co., and GEORGE W. STONE, Norris Stamping & Manufacturing Co. *Industrial Waste*, P. H. SUNNES, Culligan Zeolite Co., chairman; vice chairmen, T. B. GIBSON, Stauffer Chemical Co., and H. R. GOODRICH, Gladding, McBean & Co. *Taxation*, J. E. PHILLIPS, tax counsel, Standard of California, chairman; vice chairmen, PAUL S. FARR, Douglas Aircraft Co., Inc., and J. F. THOMPSON, Fibreboard Products, Inc. *Trade Development*, JOHN D. ROCHE, John D. Roche, Inc., chairman; vice chairman, ROBERT F. FRASER, Fraser & Johnston Co. *Legislative*, ARTHUR K. BECKLEY, Cutter Laboratories, chairman; vice chairmen, F. E. BORCHEERS, Swift & Co., and BURTON ARNDS, Sparkletts Drinking Water Corp.

Appointments to Fuel, Power and Water Committee of *California Manufacturers Association* include: KENNETH BARRETTE, *Pacific Clay Products*, Los Angeles, as vice chairman for Southern California; H. L. WEBER, *Fibreboard Products, Inc.*, San Francisco, as vice chairman for Northern California, and WM. A. DERIDDER, *General Metals Corp.*, Los Angeles, as chairman of the statewide committee.

R. W. DORST becomes assistant to general manager of *Chemical Process Co.*, Redwood City, Calif. He was formerly West Coast secretary of Liquefied Petroleum Gas Association. BENEDICK A. MARSH replaces Dorst in his former position.

California production division of *Sunray Oil Co.* now has R. E. FOSS as vice president and general superintendent.

J. M. McFADDEN takes over the post of treasurer for the *Axelsson Mfg. Co.*, Los Angeles. He has been with the company since 1938.

J. E. FERGUSON is promoted to Western division parts manager of the *Caterpillar Tractor Co.* His former post, assistant Western division parts manager, will be handled by W. L. ANDERSON. Both men will headquarter at the San Leandro plant.

E. D. STARKWEATHER, industrial relations director of *North American Aviation, Inc.*, is elected national chairman of the Industrial Relations Advisory Committee of Aircraft Industries Association.

CHARLES A. NICHOLS is promoted to director of engineering for *Packard-Bell's* Engineering Division, Los Angeles. RICHARD G. LEITNER, formerly with *Lear Co.*, succeeds Nichols as chief engineer for Packard-Bell.

GERALD W. COLLINS, former transportation rate expert with *California Utilities Commission*, replaces KENNETH L. VORE as director of transportation for *Los Angeles Chamber of Commerce*.

New general manager of *Fleishacker Paper Box Company*, San Francisco, is RICHARD WHEELER. He joined company in 1946 as head of Los Angeles sales office.

M. G. SIMPSON heads Metal Products division of *Modglin Company, Inc.* He comes to Modglin from *North American Aviation Corporation* where he was in the manufacturing development engineering department.

He will direct the division's efforts to obtain defense contracts and subcontracts of aircraft parts and sub-assemblies made of stainless steel, aluminum alloys and magnesium.

LOYD HEARN, formerly assistant publicity manager for *Los Angeles Chamber of Commerce*, begins duties in publicity department of *Union Pacific Railroad Co.*, Los Angeles. He is succeeded by STEVE BEAR.

Appointed electrical supervisor for Engineering and Service Department of *Westinghouse Electric Corporation* is JOHN H. FOSTER. Foster assumes supervision of erection and servicing of electrical equipment for industrial use in Northern California.

Nash-Kelvinator Corp. appoints DUANE A. GOUZE assistant factory superintendent of Nash Motors division, El Segundo, Calif.

Colorado

Denver & Rio Grande Western Railroad promotes LYTLETON F. WILSON, assistant general manager, to assistant executive vice president, and names K. L. MORIARTY as assistant general manager. JOHN AYER, Jr. succeeds Moriarty as chief engineer, and H. C. COSAND becomes assistant chief engineer in addition to duties as engineer of capital expenditures.

Idaho

New appointments made at Idaho Operations Office, U. S. Atomic Energy Commission, Idaho Falls, include DR. G. VICTOR BEARD, as head of health-physics branch. HERBERT M. LEPPICH is project engineer for construction of a new chemical processing plant, and WELLS R. DICKINSON is resident engineer for this chemical processing plant.

New Mexico

CONRAD W. THOMAS, former director of safety at Los Alamos Scientific Laboratory, atom research plant, succeeds THOMAS O. EVANS as mining engineer for *Santa Fe Railway's Coast Lines* in Los Angeles. Evans will concentrate on Santa Fe's "Operation Haystack" uranium ore discovery near Grants, N. M.

Oregon

Following are new officers of *Astoria Plywood Corp.*, Astoria: NORMAN JACOBSON, president; FRANK FOREMAN, vice president; Z. G. HESSELGESSER, secretary, and C. H. COOK, treasurer.

Succeeding W. W. FINNEY as superintendent of *Swift & Co.*, Portland, is E. J. VONDRA of Swift's Marshalltown, Iowa, plant.

Utah

United States Fuel Company, Salt Lake City, names GEORGE R. WATKINS as assistant to vice president and general manager, and RICHARD S. LUDWIG as mechanical engineer.

Washington

RICHARD M. MORGAN assumes duties as service manager of newly established gas turbine division of *Boeing Airplane Co.*, Richland, and EARL DELANEY is new general foreman of gas turbine shop.

CORNELIUS GROOT receives *General Electric's* highest recognition award for work of outstanding merit as research chemist at Hanford Works, G. E. technical division.

Tacoma Chamber of Commerce engages WALTER J. RYAN as consultant to their industrial bureau. Ryan, formerly chief forest engineer for *Weyerhaeuser Timber Company*, succeeds MARSHALL T. RAMSTAD who

is called into active service as commander in the Bureau of Naval Ordnance.

JAMES F. GOODRICH is new assistant general superintendent of *Todd Shipyard Corporation's* Seattle division.

A. F. GARCIA fills position of plant manager at Tacoma Reduction Works, *Kaiser Aluminum and Chemical Corporation*. Garcia steps up from his job as reduction superintendent at Kaiser reduction plant in Spokane. Garcia succeeds C. P. LOVE, who is appointed to New Orleans plant.



Garcia

ALDEN B. GRENINGER is named manager of *General Electric Company's* new Technical, Engineering and Construction Divisions, Richland. OSWALD H. GREAGER, presently assistant manager, replaces Greninger as manager of Technical division.

ASSOCIATIONS ELECT

Northwest Cannery Association: President, GEORGE M. MARTIN, *Utah Canning Co.*, Milton, Oregon; first vice president, ELVIN KALE, *C. S. Kale Canning Co.*, Everson, Washington; second vice president, J. E. KLAHRE, *Hood River Apple Growers Assn.*, Hood River, Oregon; executive vice president and secretary-treasurer, C. R. TULLEY.

Western Frozen Food Processors Association: President, L. J. CAMPODONICO, *Western Frozen Foods Co.*, Watsonville, Calif.; vice president, MARIO IELMINI, *Patterson Frozen Foods, Inc.*, Patterson, Calif.; treasurer, H. D. BUXTON, *California Frozen Foods, Inc.*, Modesto, Calif.; secretary and managing director, A. H. HARRISON.



New officers of the *West Coast Lumbermen's Association* elected at the annual stockholders' meeting held in Portland, Oregon, March 29-30. Seated, from left: *Hillman Lueddemann*, president; *Judd Greenman*, vice president for Oregon. Standing, from left: *H. V. Simpson*, executive vice president; *Col. W. B. Greeley*, vice president; *Frank A. Graham*, treasurer and *Harris E. Smith*, secretary.

California Fertilizer Association: ELMER S. NELSON, executive secretary and manager, resigns.

California section of the Instrument Society of America reelects D. C. DUNCAN as secretary. Duncan is general manager of *Helipot Corp.*, South Pasadena.

Western TRADE WINDS

News about those who distribute and sell industrial equipment and materials

DAVID W. JONES, JR., Denver, is now sales agent for *The Babcock & Wilcox Tube Company* in the Rocky Mountain area.

W. L. EGGERT, general manager of *Moore Business Forms* Pacific division, Emeryville, Calif., appointed vice president.

WALDO J. MORDINI promoted to engine sales supervisor for *Caterpillar Tractor Company's* Western sales division, San Leandro, Calif. J. J. SIMKO moves up as assistant manager of sales engineering division, headquarters in Peoria, Ill.

Skilshaw, Inc., opens a new branch at 2226 N. Division St., Spokane, Washington. This new office is under the supervision of Seattle, Wash., branch and is managed by BYRON L. HOFFMAN.

CHARLES BRADLEY, Oakland, Calif., will head a new, independent acoustic and noise control division of *Asbestos Supply Company*, Seattle, Wash. Operations will cover Alaska, Oregon, Washington and Montana.

New promotion manager of advertising and sales for *Golden State Company, Ltd.*, San Francisco, is CLARK M. PETTIT.

AL MANERBINO, Denver, Colo., is *Fruehauf Trailer Company's* new service manager for Rocky Mountain division; HANS HELMLE, Los Angeles, assumes a similar position for *Fruehauf's* Northern Pacific Coast division. Other appointments within the Northern



Manerbino



Helmle

Pacific Coast division are as follows: T. O. DAVIS, Oakland, Calif., is now assistant to division manager; Z. W. THERRIEN, manager of sales and service division in Seattle, becomes district manager of Northwest branches, including those at Spokane and

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Portland; WILLIAM F. BAILEY, Seattle, is appointed Northwest district service manager, and RALPH HOLMAN, Oakland, Calif., takes over as division used trailer manager.

Republic Supply Company of California gave a new twist to its recent Los Angeles sales convention. The usual addresses and lectures were taboo. Instead, all 85 men from the company's 16 California branches toured the Kaiser Steel Mills and Taylor Forge and Pipe Works in Fontana to give the salesmen a first-hand technical knowledge of the weld-pipe distributed by the company.

A transaction is now completed between *The White Motor Company*, Cleveland, Ohio, and *Freightliner Corporation*, Port-



Wilson D. Patterson (left), regional manager of White Motor Co., and *Thomas D. Taylor*, general manager of Freightliner Corp., try new White-Freightliner name plate.

land, Oregon, whereby a complete line of White-Freightliner diesel trucks will be available through White's branch and distributor organization.

The Bassick Company of Bridgeport, Connecticut, opens a complete new warehouse and sales office at 3320 Fruitland Road, Vernon, California.

Crane Packing Company, Chicago, transfers CHARLES K. MOERK to San Francisco office as sales engineer to handle the "John Crane" line of packings, mechanical seals and lapping machines.



Moerk

Pacific Brass Foundry of San Francisco has CLIFFORD D. MCKELVEY as its new sales manager.

Howard Supply Company, with branches throughout California, is new exclusive distributor for *Carlton Plastic Pipe and Tubing* in the state.

DAVID W. JONES, JR., appointed Rocky Mountain area sales agent for *Babcock & Wilcox Tube Company*. His offices will be at 2600 Forest Ave., Denver, Colo.

WALTER WILLIAM KIRBY, Vernon branch of the *Detjen Corporation*, is the company's new West Coast representative. He will introduce the Electrocuting Fly Screen division's products to California food industries.

The John K. Lynah Company, 2847 W. 8th St., Los Angeles, is now organized for the purpose of writing and producing technical handbooks and catalogs which will be of interest to prime contractors for Army

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and Navy equipment. The staff is composed of men who engaged in similar work during World War II.

B. F. Goodrich Company has a new sales and warehouse unit at 2500 W. 8th Ave., Denver.

Coast Pipe and Supply Co., San Francisco and San Jose, Calif., is now serving as central California representatives for the *C. A. Dunham Co.*, manufacturers of heating systems and equipment.

The new Denver, Colo., district sales office of *Patterson Foundry & Machine Company* of East Liverpool, Ohio, is now open under direction of *ROBERT ALLDREDGE* and *WILLIAM HORBLIT*. This office will provide service to chemical processing industries in Colorado, Utah, New Mexico and Wyoming.

ALVIN W. LANGFIELD, Oakland, Calif., starts his second term as president of the *National Wholesale Frozen Food Distributors, Inc.* Far Western vice president of the organization is *L. O. CASPERSON*, San Francisco.

C. Tennant, Sons & Co., New York specialist in heavy chemicals and concentrates, opens its Pacific Coast office at 333 Montgomery St., San Francisco. The office will be under the direction of *DALE W. DELANEY*, Pacific Coast manager.

LEON PEREZ is now district sales manager for *West Coast Freight, Inc.*, for the San Francisco Bay Area and Sacramento. He replaces *ROSS D. ADAMS* who has been transferred to the firm's Los Angeles district.

Pacific Rustproofing Company, Oakland, Calif., completes a new wing on its present building, which will house the small parts electroplating department of the industrial electroplating firm.

Savogran Pacific Corporation is formed by *RAYMOND T. CAREY* and *L. A. MCLEAN*, Los Angeles, in order to make available a line of paint removers and cleaners manufactured by *The Savogran Company* of

Boston, Mass. *McLean* is president of *Savogran Pacific*; *Carey* is vice president.

Straub Manufacturing Co., Inc., Oakland, Calif., is expanding its facilities to accelerate distribution of mining equipment and crushers to the Western United States and Alaska, as well as Western Canada and other foreign areas.

According to information received from *The Glidden Company*, Cleveland, Ohio, *JOHN R. GARRASON*, Western manager for *E. W. Colledge Company* for the past twenty years, is upped to assistant sales manager, Jacksonville, Fla. *RONALD O. EKHOLM*, formerly *Garrason's* assistant, becomes acting Western manager.

JAMES F. REDMOND retires as district manager of the Great Falls branch of the *Carpenter Paper Co.* *CHARLES M. PANCICH* comes from Billings to replace *Redmond*.

Precision Metalsmiths, Inc., Cleveland, Ohio, is adding new area representatives on the West Coast.

Recently completed is a new building of brick and reinforced concrete, located at 820 West Ash Street, San Diego, which will house San Diego division of *Blake, Moffitt & Towne*.

San Francisco offices for *Jarrell-Ash Co.* of Boston, manufacturers of spectrographic instruments, were recently opened, with *JOHN MARLING* in charge.

B. E. DAVID is district manager for *Arcos Corporation's* newly established West Coast office and warehouse in Los Angeles.

Graybar Electric Company's new Pacific district manager is *S. W. SCOTT*, who makes his headquarters in Los Angeles. He takes over for *H. L. HARPER*, who serves in advisory capacity pending his retirement.

Warren & Bailey Company, Los Angeles industrial supply house, opens a fully stocked warehouse in San Diego at 266 Seventh Ave. *CHARLES APERULE*, of the Los Angeles Sales

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Department, assumes position of branch manager, and *EDWARD SCHOLL*, also of the Los Angeles Sales Department, is assistant branch manager.

JAMES M. KENNEDY and *DOUGLAS WATSON* are named associate managers of *McKinsey & Company's* San Francisco office.

Lynn-Western, Inc. creates a new division for its management and engineering services for defense production programs. *NORMAN LYNN* heads up this new division.

Succeeding *L. C. McMAHAN* as chief of correspondence and contract requirements for *Boeing Airplane Co.*, Richland, Washington, is *KARL THARALSON*, Seattle. *McMahan* becomes assistant representative at *Boeing's* Dayton, Ohio, office.

E. E. SHIELDS, assistant manager of *Sudden & Christenson, Inc.*, Portland, Ore., became Seattle office manager, effective April 1, succeeding *S. H. GUENTHER*, who retired.

P. H. HAGEN joins West Coast Sales Division of *Raybestos-Manhattan, Inc.*, to handle sale of mechanical rubber products in the Pacific Northwest with headquarters at 2221 Fourth Avenue, South, Seattle.

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